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STATE OF CALIFORNIA

DEPARTMENT OF NATURAL RESOURCES

WARREN T. HANNUM, DIRECTOR

THIRTY-EIGHTH BIENNIAL REPORT

OF THE DIVISION OF

FISH AND GAME

FOR THE YEARS 1942-1944

printed in CALIFORNIA STATE PRINTING OFFICE

52283

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REPORT OF THE FISH AND GAME COMMISSION

During the past biennium, appointments made to the Fish and Game Commission under the constitutional amendment adopted November, 1940, resulted in the following changes in personnel in the commission:

H. L. Ricks appointed March 6, 1944; vice Edwin L. Carty, term expired January 15, 1943.

Dom A. Civitello appointed March 15, 1944; vice Germain Bulcke, term expired January 15, 1944.

Due to the war, unusual problems were presented to the Fish and Game Commission for its action. They shall be itemized briefly here as more detail is contained in the reports of the bureau chiefs which follow.

Recommended closing of large portion of the State in Southern California to deer hunting. This originated by a request of the General of the Western Defense Command to the Governor requesting such closures due to fire hazard.

In 1943, a portion of Lassen and Modoc Counties was opened to antelope hunting for the period September 11th to September 20th and in 1944 from September 8th to September 17th.

In 1943, due to the closure of a large portion of the State to deer hunting due to fire hazard, and finding that deer had increased in certain areas to such an extent that a surplus thereof existed, a special hunting season for deer was declared for the period December 11, 1943, to December 31, 1943.

Also due to the stress of the times, it was found necessary for the Fish and Game Commission to enact regulations controlling the sardine fishing fleet during 1943. The ensuing year, this work was conducted by the office of the Coordinator of Fisheries of the Federal Government, created by an Executive Order of the President of the United States.

The work of the Fish and Game Commission was greatly handicapped by lack of personnel, but despite this shortcoming, we are proud to report that more fish were produced in the hatcheries and more game birds reared at the State game farms than in previous years.

LIBRARY

By Bessie W. Kibbe, Departmental Librarian

Despite the war's effect on the personnel of our division, the utilization of the Library's facilities has not diminished; the requests by those who are carrying on definite fish and game studies and projects grow daily.

There has been a reduction in the number of students and other visitors from the outside, due to preoccupation with the war, although officers and men of the Army and Navy have called upon our Library frequently for information about the natural history—especially fish—of the Pacific theatre of war.

The war has continued to prevent the receipt of most foreign periodicals, although those from Australia, New Zealand and England have come through regularly.

The Library has contributed its revised holdings to the *Union List of Serials of the San Francisco Bay Region, Supplement,* one of the important tools in libraries in this territory.

The rehabilitation of some of the Library's much-used volumes, and the binding of periodicals deemed worthy of permanent retention, was carried on.

We were able to purchase the very much desired back numbers of *Biological Abstracts,* thus completing our file of this important library tool.

The Library's shelving and floor space is gradually becoming more and more crowded.

The duties connected with the properly functioning of our division's Library, which cover so many phases and sections of any general or branch library: reference, catalog, laws and legislation (fish and game laws and reports of all States and foreign countries) and order section, have so materially increased with the steady natural growth of our Library, that it is becoming somewhat difficult for one person to carry on, in an adequate and completely satisfactory manner, all the attendant details that the management of such a Library entails. It is hoped that when more normal times return, additional facilities, both in space and assistance, may be given this Library.

The policy of the division's Library, with restricted funds permitting, is to furnish books and material helpful to our force in the studies and work pertinent to fish and game and conservation thereof. To this end, during the thirty-eighth biennial period, we have added 336 books; by purchase amounting to $1,243.14; by gift $188.35. The total number of bound volumes on file is 3250, with a value of $11,772.18.

Scientific pamphlets added during this period were 718, being $59.11 by gift; $103.64 by purchase. Total number of pamphlets catalogued and filed are 7997, with an appraised and/or known value of $1,385.53. Books and pamphlets represent $13,157.71.

A microfilm reader and certain special films were added to the other property holdings of this Library, but the value of all such property is not included in this report.

REPORT OF THE BUREAU OF FISH CONSERVATION

By A. C. Taft, Chief

During the biennial period work has centered around an effort to maintain a normal program so far as wartime limitations would permit. Differences between this and the previous biennium are thus largely those brought about by the war.

The year 1941, just prior to the war, was the all time high in the sale of angling licenses, 458,177 having been issued. On the basis of experience in the previous World War it was expected that license sales would fall off rather severely in 1942 and 1943. This did not occur and 433,431 were issued during the first year of the period and 439,860 during the second. Even during 1944 under drastic gasoline rationing both for boats and cars it appears that the number of anglers will be within 6½ per cent of the high figure for 1941.

With angling effort remaining at a high level the problem of maintaining the supplies of fish under definite limitations as to manpower and equipment became difficult. Almost all assistant wardens, both permanent and seasonal, left the division and only 30 permanent fish hatchery assistants remained out of a normal quota of 50. Even with such temporary replacements as could be made the total manpower remained from 12 to 15 per cent below normal. In a number of instances the wives of hatchery employees and other women were hired for seasonal or part time work, which made it possible to carry on work at stations which would have otherwise been closed.

Little new equipment has been available and inability to make replacements has been most severely felt in heavy trucks, gasoline motors for fish planting equipment and tires. No new tires have been purchased since 1941 and only careful management and the utmost economy in mileage has made it possible at the same time to plant an increasing amount of fish.

In 1940 there were 133,949 pounds of trout planted and in 1941 the total was 167,647. In spite of the many problems of operation brought about by the war the poundage was increased to 238,279 in 1942 and to 275,401 in 1943. The 1943 planting was thus an increase of 12 per cent over 1942. The point has now been reached where more than a pound of trout is being planted for each licensed angler who fishes for trout. It is not to be expected that this total can be very much increased with present facilities of manpower and equipment.

The following table shows the hatcheries and egg taking stations that were operated during the biennium. Where operations were temporarily or permanently discontinued that is also indicated.

TABLE 1

Hatcheries and Egg Collecting Stations Operated 1942-43

Hatcheries

Alpine, temporarily closed in 1943
Arrowhead, closed in 1943
Basin Creek
Black Rock, opened in 1942
Brookdale
Burney Creek
Central Valleys
Coy Flat (seasonal), opened in 1942
Fall Creek
Feather River
Fern Creek, closed in 1942
Fillmore, enlarged in 1942
Fort Seward, closed in 1943
Hat Creek
Huntington Lake (seasonal), temporarily closed in 1943
Kaweah
Keru
Kings River
Lake Almanor
Madera (seasonal), temporarily closed in 1943
Mount Shasta
Mount Whitney
Prairie Creek
Rearing Reservoirs, closed in 1943
Sequoia
Tahoe
Tallac
Yosemite
Yuba River

Egg Collecting Stations

Fall Creek (Steelhead and salmon)
Little Walker Lake (Eastern brook)
Prairie Creek and Lost Man Creek (Silver salmon)
Rush Creek (Loch Leven)
San Lorenzo River (Steelhead)
Snow Mountain (Steelhead)
Heenan Lake (Black spotted), closed in 1943
Kirman Lake (Eastern brook), closed in 1943
Klamathon (King salmon), temporarily closed 1943
Lake Eleanor (Rainbow), closed in 1943
Shasta River (Steelhead), closed in 1943

At the end of the biennium only four of the seven members who composed the regular biological staff at the start of the war remained on duty —Brian Curtis, Supervising Fisheries Biologist, and Joseph H. Wales, Leo Shapovalov and William A. Dill, District Biologist. The three junior aquatic biologists were on military leave, Earl Herald having left before the beginning of the biennium and Elden Vestal and Chester Woodhull at the end of 1942. Six men were employed at various times on seasonal or part-time basis, A. B. Murphy, Alex E. Culbertson, J. C. Marr, Garth Murphy, Warren R. Cheney and William H. Davenport.

The accomplishments of the staff are to some extent reflected in the list of reports and publications which follows. Routine activities were carried on such as lake and stream surveys and recommendations for stocking, for stream closures and for other forms of regulation. Projects of special interest are described below.

The life history of the steelhead and, incidentally, of the silver salmon, has been under study at Waddell Creek since 1932. Mr. Leo Shapovalov has practically completed writing up this work which will be published shortly and which will be an outstanding contribution to the knowledge of these species.

That part of the Colorado River which borders California was surveyed by William A. Dill and Chester Woodhull in 1942. The resulting report, published in July of 1944 after an exhaustive study of the data obtained, presents information about this area never before brought together under one cover and offers concrete proposals for the management and regulation of the fishery.

Experiments on the electric fish screen were carried on by J. H. Wales at Hat Creek in Shasta County where the Pacific Gas and Electric Company installed one of these devices at their Hat No. 2 Power House and made it available to us for this purpose. Here the discovery was made that if, instead of placing the live electrodes downstream from the ground as has been done in the past, they were placed upstream, there would result an electric field extending upstream from the electrodes with gradually diminishing strength. It is possible that this system will prove better adapted to the repulsion of fish of all sizes than the previously used design, where the field extended with quite uniform strength from the electrodes upstream to the ground and then ended rather abruptly. As a result of these experiments the desirability of further knowledge of the water velocities which trout of various sizes can overcome became apparent and accordingly tests on their swimming speed are now underway at Mt. Shasta Hatchery.

Lake fisheries have received much attention during the biennium. June and Gull Lakes in Mono County were under close observation by Elden Vestal prior to his induction into the Army in December, 1942, and here it was shown that planting of sized rainbow from the Hat Creek fall spawning stock at the opening of the fishing season would provide a yield of 50 per cent to the anglers' creels. Intensive studies by J. H. Wales of Castle Lake in Siskiyou County dealt with the yield obtained by planting fingerling trout of various species and showed that on the average about 5 per cent of the number planted would reach the angler's creel. The latest step here has been the introduction of soy bean meal to see if fertilization of a natural lake of this size can be a practical means of improving its fishery. Clear Lake was investigated at the request of the Lake County Board of Supervisors with respect to the effect on the sport fishery of commercial netting of rough fish and regulations were proposed under which the latter is now carried on. A preliminary survey of Millerton Lake above Friant Dam was completed and one of the Shasta Reservoir initiated. Creel counts of a less extensive nature were carried on at Stevens Creek Reservoir in Santa Clara County and at Frog Lake in Nevada County. A project for the survey of barren lakes has been carried on each summer by Mr. Dill in cooperation with the Fresno County Sportsmen's Club for the purpose of assuring proper management of these lakes from the start.

The control of rough fish in lakes through rotenone poisoning has been difficult due to the shortage of this material, but Ballard Reservoir in Modoc County has been successfully treated and brought back into production, as well as two smaller lakes in this same region, Cave and Lily.

The whole question of stream flow maintenance has received much attention, from high altitude check dams for the improvement of mountain streams to amounts of water needed for release, from dams built and to be built on our large rivers, for preservation of fish and fishing.

The Salton Sea mullet fishery was briefly investigated by Dill and Woodhull and recommendations made on which the present regulation of the commercial catch is based.

At the Central Valleys Hatchery at Elk Grove experiments were initiated which have to do not only with the production of spiny rayed fishes for stocking but also with desirable species combinations for use

in farm ponds. Interest in the latter is apparently on the increase in California.

The striped bass investigation has suffered from lack of competent personnel. A trained biologist, Garth Murphy, was employed November 15, 1943, on a part-time basis but was inducted into military service in March, 1944. During that period his work consisted principally of sampling the sportsman's catch with reference to the concentrations of fish and to their growth, food, spawning habits, etc. In an effort to get some idea of the number of striped bass taken by commercial nets, three salmon fishermen were inducted to keep records during May and part of June. These indicated one bass to every 10 to 15 salmon.

An experiment started in 1941 bore fruit in 1943. The "Kokanee," a landlocked form of the sockeye salmon very popular with fishermen in Washington and Oregon, but not found in California, was introduced into Salt Springs Reservoir on the Mokelumne River in July, 1941. These fish throve and reached maturity in the autumn of 1943 when eggs were taken for transplanting. To the eggs thus obtained were added others purchased outside the State and the experiment is now being extended by planting these fish in several other lakes in different parts of the State.

Statistics on the angling catch were gathered as usual throughout the biennium but the 1943 report is not yet ready due to delay in processing of the material by the organization which contracted for this work when it was given up by the division's statistical department at Terminal Island because of reduced personnel. The 1942 figures showed a trout catch of 16,400,000 by 234,000 anglers as against a catch of 15,700,000 by 238,000 anglers in 1941, with an increase in the average catch from 66 to 70. The striped bass catch in 1942 was 1,760,000 by 93,000 anglers as against 2,035,000 by 111,400 anglers in 1941, the average catch remaining unchanged at 18 fish per angler for the season.

The editorship of the quarterly magazine CALIFORNIA FISH AND GAME was assigned to Brian Curtis when Richard Croker went into the Army at the beginning of the biennium.

Following is a list of the publications and administrative reports prepared during the biennium.

PUBLICATIONS

Reclamation with Rotenone of Crystal Lake, Los Angeles County, California, Elden H. Vestal. Vol. 28, No. 3, C. F. and G.

A game fish for the Salton Sea, the ten-pounder, *Elops affinis*, William A. Dill and Chester Woodhull. Vol. 28, No. 4, C. F. and G.

Resources of the Sea in Wartime. Brian Curtis. Vol. 28, No. 4, C. F. and G.

Twenty-five years ago in CALIFORNIA FISH AND GAME, Brian Curtis. Vol. 28, No. 4, C. F. and G.

Twenty-five years ago in CALIFORNIA FISH AND GAME, Brian Curtis. Vol. 29, No. 1, C. F. and G.

Twenty-five years ago in CALIFORNIA FISH AND GAME, Brian Curtis. Vol. 29, No. 2, C. F. and G.

Twenty-five years ago in CALIFORNIA FISH AND GAME, Brian Curtis. Vol. 29, No. 3, C. F. and G.

Twenty-five years ago in CALIFORNIA FISH AND GAME, Brian Curtis. Vol. 29, No. 4, C. F. and G.

Twenty-five years ago in CALIFORNIA FISH AND GAME, Brian Curtis. Vol. 30, No. 1, C. F. and G.

Creel Returns From Hatchery Trout in June Lake, California, Elden H. Vestal. Vol. 29, No. 2, C. F. and G.

Rehabilitation of a Modoc County Reservoir for Trout Fishing, J. H. Wales. Vol. 29, No. 2, C. F. and G.
Fish Rescue in California, Chester Woodull. Vol. 29, No. 3, C. F. and G.
Mussel Poisoning Twenty-five Years Ago and Today, Brian Curtis. Vol. 29, No. 3, C. F. and G.
James Moffitt, 1900-1943, Brian Curtis. Vol. 29, No. 4, C. F. and G.
*Black Spotted Trout in Blue Lake, California, A. J. Calhoun. Vol. 30, No. 1, C. F. and G.
Fresh Ocean Fish as a Trout Diet, J. H. Wales. Vol. 30, No. 1, C. F. and G.
The Tench in California, Leo Shapovalov. Vol. 30, No. 1, C. F. and G.
Trout Fishing Restored to Modoc County Reservoir, J. H. Wales. Vol. 30, No. 1, C. F. and G.
**Hesperoleucus symmetricus* Reported From Clear Lake, Lake County, California, Garth Murphy. Vol. 30, No. 1, C. F. and G.
*The Food of the Black-spotted Trout (*Salmo clarkii henshawi*) in Two Sierra Nevada Lakes, A. J. Calhoun. Vol. 30, No. 2, C. F. and G.
*The Bottom Fauna of Blue Lake, California, A. J. Calhoun. Vol. 30, No. 2, C. F. and G.
The Fishery of the Lower Colorado River, William A. Dill. Vol. 30, No. 3, C. F. and G. (In press at end of biennium).

The following were published by members of the Bureau of Fish Conservation other than the biological staff:

Diamond-back Terrapin Introduced into California, A. C. Taft. Vol. 30, No. 2, C. F. and G.
In Memoriam, Richard de Large, A. C. Taft. Vol. 30, No. 2, C. F. and G.
John Otterbein Snyder, A. C. Taft. Vol. 30, No. 1, C. F. and G.
Selective Breeding of Rainbow Trout at Hot Creek Hatchery, R. C. Lewis. Vol. 30, No. 2, C. F. and G.
Golden Trout Propagation in California, George McCloud. Vol. 29, No. 4, C. F. and G.

ADMINISTRATIVE REPORTS

Brian Curtis

Angling Catch Records, 1942. Submitted April 24, 1944.
Angling Catch Records, 1941. Submitted July 10, 1942.
The Frog Lake (Nevada County) Fishery in 1943. Submitted March 1, 1944.
The Frog Lake (Nevada County) Fishery in 1942. Submitted January 12, 1943.
Fisheries Aspects of South Fork of Stanislaus Stream Flow Maintenance Surveys. Submitted September 14, 1943.
Report on Check Dam Reconnaissance in Silver Lake, Amador County Area. Submitted September 16, 1942.

Joseph H. Wales

Poisoning of Cave and Lily Lakes, Modoc County, October 18-19, 1943. Submitted November 30, 1943.
General Report on Lake Almanor, Plumas County. Submitted December 10, 1943.
Castle Lake Report for 1943. Submitted March 17, 1944.
Castle Lake Report for 1942. Submitted January 13, 1942.
Report of Investigations on Clear Lake, Lake County, California. Submitted April 10, 1943.
Report of Tests Made at the Hat No. 2 Electric Fish Screen, June-July, 1943. Submitted August 12, 1943.
Diversion of Water From the Pit River to the Pacific Gas and Electric Pit 5 Power House. Submitted March 12, 1944.
Summary of Weekly Disease Reports for 1943. Submitted March 15, 1944.
Summary of Weekly Disease Reports for 1942. Submitted March 2, 1943.
Shasta Valley Fish Screens. Submitted January 14, 1944.

William A. Dill

Tule Indian Reservation Project, Report on 1942 Fish Marking and Planting. Submitted October 14, 1942.

* Publications based on work performed by the author while employed by the Division of Fish and Game.

The Inland Mullet Fishery of California, Report No. 2. Submitted November 10, 1942.

A Preliminary Report on the Potential Fishery of Millerton Lake With Suggestions for its Management. Submitted April 9, 1943.

A Fisheries Survey of the Upper Bear Creek Drainage, Fresno County, California. Book 1, General Account; Book II, Detailed Surveys of Individual Waters. Submitted May 28, 1943.

Tule Indian Reservation Project, Report on 1943 Fish Marking and Planting. Submitted October 1, 1943.

Stream Closure in Tulare County: Boulder Creek. Submitted June 5, 1944.

Preliminary Suggestions for Postwar Projects, Fresno Biological District. Submitted June 15, 1944.

The Colorado River Survey, 1942. Book I, Dams, Diversions, Pumps. Submitted June 26, 1944.

William A. Dill and Chester Woodhull

The Tule River Indian Reservation Creel Count, 1942. Submitted August 21, 1942.

The Possibilities of Increasing and Maintaining a Run of Salmon (*Oncorhynchus tshawytscha*) in the Kings River, California. Submitted September 10, 1942.

William A. Dill and G. S. Gunderson

Hatchery Sites, Tulare County: Moorehouse Creek Spring. Submitted September 30, 1943.

REPORT OF BUREAU OF GAME CONSERVATION

By J. S. Hunter, Chief

The need for a better understanding of the problems of conservation by all interested has been very apparent during the past biennium. With the need to produce more food it has been necessary to give consideration to all those causes that result in less production, and with the higher value of agricultural crops the loss of any portion of the crop has been more apparent to the producer. Wildlife that reduces crop production is regarded by the extremist the same as insect pests and should be destroyed. Fortunately such people do not predominate and wildlife, generally, is regarded both for its intrinsic and aesthetic value. It is, however, necessary for the conservationist to give consideration to the damage that is or may be caused and to develop protective measures that will keep the loss to an inconsequential minimum. Under normal conditions this is a difficult problem but under conditions that have prevailed during this biennium it has been stupendous.

There are several areas in the State where deer have caused many complaints. In the Stonyford area, in the Sacramento Valley, a study was made of the situation and it was agreed by all interested parties that if a brush area were burned in the area adjacent to the farming section, it would relieve the situation but after consent had been secured from the State Department of Forestry, the permit allowing burning was canceled and we were unable to carry out the experiment.

In Modoc County there have been complaints from stock interests that deer were destroying browse and feed and it was no longer possible to carry the same number of cattle as had been grazed in previous years. The deer that caused the damage moved into California during heavy winters from Oregon and in order to relieve the situation the Oregon commission has had an open season on does since 1941. During that time some 4,574 antlerless deer have been taken. From recent studies we find this has greatly relieved the situation.

In the Doyle area of southern Lassen County a study was carried on by the staff of the Bureau of Game Conservation to determine the extent of damage to farmers by Rocky Mountain mule deer and the approximate number of deer involved. This problem is still being studied with a number of proposals being considered to alleviate the damage. Land acquisition, herding and herd reduction have all been proposed, and all of these may be used in part to remedy the situation.

The increase of waterfowl during the past several years has brought about many complaints from certain agricultural areas, particularly in the rice fields of the Sacramento Valley and the rice and other fields in the Imperial Valley. Progress has been made in reducing this problem and we hope to be able to solve it.

Botulinus has been prevalent at Tulare Lake since the area was flooded in 1937. Mr. D. D. McLean has carried on investigations in that region and reports as follows: Botulinus or duck disease was active at

Tulare Lake in 1942 but to a lesser degree than in previous years. The 1943 infection was about the same as in 1942.

1942—461 ducks picked up—388 banded and released—73 lost
1943—576 ducks picked up—484 banded and released—92 lost
15.6 per cent loss in 1942
16.2 per cent loss in 1943

For comparison the 1941 figures show: 5,711 ducks picked up; 4,912 banded and released; 799 lost, 13.9 per cent loss. The radical difference in the number of sick birds was evidently due to the change made by the farmers in the management of their irrigation water during the late summer and fall. They began the new system in 1942, whereby the water was kept moving from one field to the next lower one as soon as the first field was flooded and soaked. The intervening levee is cut and the water kept moving from one field to the next until the irrigation is completed. On completion of the irrigation, water is pumped back into the lake. This system keeps the water moving and does not give the vegetation time to start decomposing in the warm standing water. The old system of allowing fields to remain flooded for weeks at a time found the water temperatures rising and heavy decomposition with a corresponding decrease of oxygen content in the water. The botulinus bacillus thrived in such a medium. Under the new system most of the duck disease was found in low, undrained spots on the fields and in barrow pits.

The fall duck population has increased steadily in the Tulare Lake region each year since 1938. The 1942 and 1943 peak populations were not radically different. The 1942 peak was on or about October 8th, when 3,500,000 were estimated to be in the area, and the 1943 peak was on October 10th, with 4,000,000 birds estimated to be present.

Water surface temperature, bottom temperatures, sun temperatures, shade temperatures, wind direction and velocity, and general weather conditions were noted and correlated with the severity of the disease.

Intensive study has been given the problem of providing shooting areas for unattached duck hunters. To R. E. Curtis, a member of the staff, was given the task of working plans of procedure and operation. His approved report follows:

WATERFOWL PUBLIC SHOOTING GROUNDS IN CALIFORNIA

Suggested Management Practices and Estimated Costs

Objectives

Waterfowl management in California presents problems that are probably unique in the United States. Reclamation has reduced and agriculture has encroached upon the natural waterfowl habitat to an extreme extent.

Public shooting grounds in this State will have two principal objectives: (1) To provide the unattached hunting license holder with a place to shoot at reasonable cost. (2) To control and minimize waterfowl depredation on agriculture.

To accomplish the first purpose it will be necessary to bring under control of the Division of Fish and Game, by purchase, lease, or otherwise, large tracts of strategically located, suitable land, and to so administer these areas that the greatest possible number of hunters may be accommodated with reasonably good shooting.

The second objective can be secured by: (a) Providing on the shooting grounds food and habitat that will successfully compete with the surrounding agricultural lands. (b) Maintaining, through hunting, a waterfowl population level commensurate with the available food and habitat.

Methods

Methods of land acquisition do not require discussion here.

Plans for operation and administration of public shooting areas must be carefully considered. There is little practical experience from which to draw information. Public shooting grounds operated by the U. S. Fish and Wildlife Service are, in the main, not comparable to conditions that must be met in the Sacramento-San Joaquin Valleys. Large commercial clubs furnish the most comparable conditions, but since their objectives are confined to furnishing reasonably good shooting and making a profit, much of their methods are not applicable.

Subsequent to acquisition of suitable lands the operations to be considered are: (1) Engineering development; (2) Food crop planning, planting, and management; (3) Administration of the hunting.

Engineering Development

A reasonably detailed topographic survey is the first requirement. From this data the plan of ditches, dams, and other water control structures can be formulated. In the completed development, water area should approximate one-third of the total.

Under California conditions it is doubtful that all water areas can be maintained continuously. However, as much water area as possible should be maintained at constant level in order to promote aquatic vegetation and minimize the possibility of botulism epidemics.

Water distribution and control structures should be simple to operate and of durable construction. In times of water shortage it should be possible to drain higher ponds, successively into lower ones, in order to retain optiumum conditions in at least the lowest structures.

Engineering and development costs will vary with the terrain and it will not be possible to obtain the optimum balance of one-third water, two-thirds land for reasonable cost at all points. On the most suitable terrain these costs should not exceed $10 per acre, but over all it will be safer to allot a cost of $15 per acre for this purpose.

Water Supply and Cost

Adequate water supply is the primary necessity for waterfowl developments. In certain localities water rights appurtenant to the lands or agricultural drainage waters may provide this necessity at little or no expense. In considering the over-all plan, it will be more practical to assume that all water must be purchased at prevailing agricultural rates.

Rice growers commonly obtain water for $1.25 per acre-foot, and this figure is here accepted as the probable average cost for the entire project. It is estimated that in order to provide irrigation, to offset evaporation, seepage, transpiration, and other losses, enough water should be provided to cover the entire area three feet deep each year. Since only one-third of the entire area is to be submerged, this three feet over-all would provide nine feet per year for the pond area. This amount

should be adequate to offset losses from the submerged area and to provide crop irrigation on the rest.

The water cost would thus be $3.75 per acre per year for the entire area. This is believed to approximate the maximum cost for gravity water. If it is necessary to resort to pumping of subsurface water, this figure will probably be exceeded.

Crops

In order to relieve crop depredation during the entire time waterfowl are in the State in numbers, and to hold them on the shooting grounds during the hunting season, it will be necessary to grow as much food as possible on these areas. Artificial feeding is barred by Federal regulation on the shooting grounds.

Suitable food crops include rice, wheat, barley, oats, rye, millets, watergrass, nonsaccharine sorghums, corn alfalfa, clovers, and aquatic plants.

Numerous rice growers have expressed doubt of the ability of any other grain crop to compete with rice as a waterfowl attractant. This remains to be proven. The high cost of producing a rice crop argues against its use on public shooting grounds, unless other and cheaper crops fail to produce the desired result. It is believed that the common small grains, particularly wheat and barley, properly handled, will serve the desired purpose adequately. The millets (watergrass) are very attractive to waterfowl and are commonly used by blackbirds.

The small growing, nonsaccharine sorghums, such as doubledwarf milo, are readily taken by waterfowl, are economical to produce, and should be used, especially where late planting is necessary.

Along the Mississippi flyway field corn constitutes one of the important waterfowl foods. It should be experimented with here in suitable locations.

In certain locations on the areas under consideration it is reported that "goose-grazing" effectively prevents the production of small grains. In such locations alfalfa, Ladino clover, or perennial burnet should provide a solution to the food problem.

Aquatic plants provide a considerable part of the food of many waterfowl species. Much remains to be learned regarding the successful management of aquatics under California conditions. Most of the native varieties will appear naturally if water conditions are favorable. In new water areas artificial planting will probably be justified. Fertilization of pond waters is a new development and should be studied in this connection. Exotic aquatic species should be tried on an experimental basis. To date, the most favored eastern species, wild rice and "wild celery," have not proved successful in this State.

Cropping Methods and Costs

Three means of producing crops on the state-owned lands have been suggested: (1) Share-cropping; (2) Contract planting; (3) Use of State personnel and equipment.

Share-cropping in this case does not appear to be a practical solution since the primary object in producing the crop is to feed waterfowl, not humans or domestic stock. It would defeat the purpose of the project to drive waterfowl away from the crop. The landowner's share is commonly only one-third.

Crop planting by contractors affords arguments both pro and con. Utilization of this method will relieve the State of the necessity of purchasing and maintaining large quantities of farm machinery. Labor personnel problems will be simplified. Seed furnished by the contractor will eliminate a purchase problem.

On the other hand, the contractor will expect to make a profit on the operation, thus increasing cost. The slow, cumbersome process of awarding State contracts and delay in payments will deter many bidders. Those best fitted to do the work, the local agriculturalists, will do their own planting at the most advantageous time and plant State crops either early or late.

Crop production with State personnel and equipment should be tried on a small scale and expanded if results are satisfactory. Some suitable equipment must be owned by the project for maintenance and its utilization in crop production will be economical.

Crop Production Costs

Small grains are expected to form the backbone of the project program. Seed bed preparation, seed, and seeding should not exceed $5.25 per acre under any foreseeable circumstances, and under normal conditions should be less. Itemization follows:

Plowing	$2.00 per acre	
Discing	.50 per acre	
Drilling	.50 per acre	
Seed	2.25 per acre	(90 # at $2.50 cwt.)
Total	$5.25	

It is estimated that not over 50 per cent of the entire area will be planted in any one season, the remainder being 33⅓ per cent water, 16⅔ per cent waste and grassland. Thus, an average cost of $2.625 per acre is assignable for the entire tract.

Utilization of Crops—Grazing

A large part of the lands proposed for acquisition are essentially pasture land at present. Minor portions are cropped to barley, rice, milo, and beans. Under management as public shooting grounds the most practical economic agricultural by-product of these lands will be pasturage. The cash return from this source under present usage averages $3.50 per acre annually. Under game management the grazing intensity and season will be restricted, but the quality and quantity of forage will be increased. Allowable grazing should bring a minimum cash return of $2 per acre per year.

In normal years a short period of spring grazing (when land is dry enough) can be permitted. This procedure is generally beneficial to grain crops. As soon as grain is matured, pasturage will again be permissible.

It has been found in similar operations at Honey Lake (Lassen County) that grazing cattle on matured grain serves to shatter a large part of the grain onto the ground where it becomes available to waterfowl and pheasants. If grazing is not practiced, it is neces sary to drag down the standing stalks or to flood the land to make the grain available to waterfowl.

Pasture cattle should be removed before the shooting season unless owners sign waivers for damage and loss.

Pasturage by sheep should not be allowed in most cases. Their use may be permissible under special conditions as where it is desirable to remove weed growth.

Payments to Counties in Lieu of Taxes

It is anticipated that strong objection to State acquisition of large tracts of lands will arise unless some means is devised to compensate the respective counties for loss of tax revenue. Legislative action will be required before this is possible. Such payment should be limited to the amount of taxes levied at the time of acquisition. The type of lands being considered are largely marginal so far as agriculture is concerned. On the basis of current land values and tax rates, the charge for this item should not exceed 50 cents per acre annually.

Hunting Management

This will unquestionably be the most difficult phase of the entire program. The term "public shooting ground" will convey to many the idea of free and unrestricted use by any or all individuals. This will not be possible. All applicants can not be accommodated at any one time. Some system of accepting and acknowledging applications must be devised. Priority of requests appear to be the only fair basis of assigning hunting privilege. To produce a workable system will require much thought, effort, and experience.

Cost of permits must be kept substantially lower than charges by commercial clubs if the plan is to benefit the hunting public. Charges for the first season must be estimated as closely as possible; thereafter charges should be modified annually in conformity with the previous year's actual costs.

What expense shall be considered in determining permit charges? If initial cost of the land is met from accumulated license fees, paid in part for this specific purpose, then no attempt to recover cost of the land through permit fees is justifiable. Development, maintenance, and operating costs can and should be met by permit fees.

Development costs should be amortized over a considerable period of years, not less than 10, and preferably 20. Over a 20-year period the permit fee attributable to this source would be 75 cents per acre per year. Other costs to be added to the permit fee are outlined and summarized below.

It is believed that a minimum of 20 acres should be allotted to each double blind, or 10 acres per permittee. In addition, one-third of the entire area should be closed to shooting each season to provide unmolested feeding and loafing space. This will avoid driving the birds from the tract when the season opens. Thus 15 acres becomes the actual minimum for each hunter and is the unit on which the fee per shooter day must be calculated.

If salaries of employed personnel are to be charged to the hunter, they can be estimated as follows:

Two permanent employees for each 5,000 acres	$4,800 per year
Extra seasonal labor for each 5,000 acres	2,700 per year
Total	$7,500 per year

This amounts to a charge of $1.50 per acre yearly.

Maintenance costs (structural repairs, weed control, etc.) should not exceed $1.50 per acre.

Summarization of Annual Costs

Item	*Cost per acre*	*Cost for 15-acre Unit*
Development (20-year amortization)	$.75	$11.25
Planting (one-half of entire area)	2.63	39.45
Personnel cost	1.50	22.50
Water	3.75	56.25
Payment in lieu of taxes	.50	7.50
Maintenance	1.50	22.50
Total yearly cost	$10.63	$159.45
Less income (pasturage)	2.00	30.00
Net annual cost	$8.63	$129.45

Under the present season there is an average of 35 shooting days per year (three per week plus opening, closing, and holidays). The cost per man per day thus becomes $3.70 ($129.45 ÷ 35 permits). It is reasonable to assume that a small percentage of hunters will not take up their reservations. If this is assumed to be one in seven, the charge becomes $4.32 for each permit ($129.45 ÷ 30).

It has been suggested that the guide plan used by the U. S. Fish and Wildlife Service on their large public shooting ground in the Dakotas be followed. Here, we understand, a guide is required for each double blind, the occupants furnishing his wages of $7 per day as part of their permit fees. It is believed that conditions in Dakota are quite different from those that would prevail on California shooting grounds. Travel to and from blinds is probably by boat, making it practical for a guide to serve only one blind. If the guide system is adopted in this State, it may be practical for a guide to serve as many as four blinds, thus reducing the guide cost per shooter to $1 per day, wage being assumed to be $8 per day.

Pheasant Shooting

Under the management plans outlined above, a heavy pheasant population may be expected to develop on the shooting grounds intended primarily for waterfowl. The pheasant hunting season comes within the waterfowl season, but if pheasant hunters were allowed to operate at the time waterfowl blinds are occupied, waterfowl shooting would be spoiled. It is suggested, therefore, that all pheasant hunting on these lands be limited to regular waterfowl shooting days, that the one permit fee pay for both types of hunting, and that pheasant hunting be limited to the period between 10 a.m. and 3 p.m.; before and after these hours all hunting to be restricted to occupants of blinds.

DEER, ELK AND ANTELOPE

Regulations promulgated by the Fish and Game Commission at the request of the War Department restricted the deer season in 1942 to 21 days in the counties on the coast from Santa Cruz to Mendocino, inclusive, and prohibited the hunting of deer in Southern California, including San Luis Obispo, Santa Barbara and Ventura Counties. In the Sierra

region hunting was prohibited below Ponderosa Way, approximately 2,500 feet elevation. This prohibition reduced the kill to 25,902 as against 43,493 for the year previous. In 1943 deer hunting was prohibited by the War Department in the coast counties and in Southern California. The take in the counties opening September 16th totaled 21,882. In view of the fact that there had been no open season in Southern California for two years, the commission declared an open season in the southern counties and in Monterey, San Benito, San Mateo, Santa Cruz, and the western portion of Santa Clara, Merced and Fresno Counties, from December 11th to December 31st. Three thousand three hundred twelve deer were taken during this season.

Questionnaires were sent to nearly 3,000 successful hunters in which they were asked pertinent questions. Only in Los Angeles and San Bernardino Counties were the hunters in favor of a winter season. Few hunters reported fat deer and the general opinion was that the animals were from 25 per cent to 30 per cent underweight. In many instances, antlers were loose and in some localities bucks had already dropped their antlers. Those that favored a winter season did so on account of the cooler weather and less fire hazard. Those against, on account of the condition of the animals.

Acting under the authority of Section 39.1 of the Fish and Game Code, the commission in 1943 had an open season on elk in the Owens Valley. Hunting was permitted from December 4th to 11th. Seventy-five permits issued allowing the taking of one bull each. Forty-three animals were taken. The largest with the viscera removed weighed 490 lbs. Following are the measurements: Antlers, right 38.5″; left 36″; spread 43″; tip to tip 40.12″; base, right 9.12″; left 9.6″; number of points, right 6; left 6.

In 1943 the commission again opened the season on antelope, fixing the dates September 8th to 20th, inclusive. The same procedure in issuing permits was followed as had been used in the 1942 season. Five hundred permits were issued. Eighty-seven per cent of those who hunted were successful and took 362 antelope.

The antelope census was carried on by airplane as in the past with a favorable increase in numbers being indicated. In 1943 the count was 5,338 and in 1944, 6,147. The 1942 count was 3,752. These counts were made in Lassen, Modoc and Siskiyou Counties on the known winter ranges. One band of 171 was found in Shasta County near Fall River Mills, in 1944.

Study of parasites and diseases of game has been continued by Dr. Carlton M. Herman. His report follows.

PARASITES AND DISEASES

During the period covered by this report there have been many cases of evidence of disease causing loss in deer populations, primarily in the coastal counties and particularly in Mendocino and Sonoma Counties, although the same condition occurs more or less from the southern part of the State to Humboldt County, as well as in Lake and Trinity Counties.

Examination of a number of animals seems to point to the round-worm infections of the upper digestive tract as the most frequently occurring disease condition, and to such an extent that much of the losses could be attributed to this infection. A number of species of round-

worms occur, all causing the same general pathology and all having similar direct life cycles. Most of them are common parasites of sheep and cattle and were undoubtedly introduced into this country with the domestic flocks and herds.

The extreme irritation to the intestinal tract usually causes a diarrhetic condition referred to as scours. It is usually more evident in the younger animals. The developing eggs of the worms pass out of the intestinal tract with the deer's droppings and the larval worms hatch out in the soil. After a period of development they become ripe for infection and migrate up moist blades of grass. Deer (or cattle and sheep) become infected when they eat such contaminated grass.

Many factors are involved in the ultimate condition of deer as a result of these parasites. Some of these are temperature, moisture, the extent of use of the pasture by infected deer or livestock, and the amount of grazing done by the deer on such infected areas. In point of sequence this last factor seems to be the most important in the health of the deer population. Where these infections are the only ones involved in reductions of deer, a direct proportion can be hypothesized between the amount of grazing and the extent of the losses. The more browse available, the less infection with these worms. It is mainly in areas where deer would be most likely to live chiefly on a grass diet that this condition becomes severe. In areas where it has not been observed, or where the severity was of little significance, the stomach contents of the deer examined showed a predominance of browse.

In March, 1944, in collaboration with the U. S. Park Service and U. S. Fish and Wildlife Service, an investigation was made of deer conditions in the Sequoia National Park. Here, again, these intestinal worms were found to be of much importance. In this area, too, deer are suffering from intensive eyeworm infections. All deer infected with these small worms in the eye at Sequoia have upwards of 30 worms per eye, whereas when we have observed the same infection in deer in other parts of the State, very few worms have been present.

Our program on the occurrence of blood parasites of quail has been continued, although reduction of field personnel has greatly reduced the number of samples. With the cooperation of the Associated Sportsmen of California and other hunters, we have obtained many samples of blood and hearts in an effort to determine the distribution of these diseases. This program shall be continued and expanded. As a result of our studies on quail we have uncovered at least three important parasites new to science. As a part of this program we are studying the parasites of other species of birds to determine what diseases are common to all birds as well as those that occur only in our game species.

Two winter outbreaks of botulism were observed in ducks and coots: (1) Gridley, with varying intensity during winter 1943-44; (2) Mt. Eden, January, 1944.

Preliminary investigations were made on the source of so-called "iodine" ducks in the lower San Francisco Bay area during the 1943 duck season and plans have been formulated to make an intensive investigation of this condition during the 1944 season.

Numerous other parasites and diseases were diagnosed in the wildlife of the State and investigations on the epidemiology of many of the

parasites are in progress. A total of 614 birds and 149 mammals were autopsied.

The following papers were published:

1942

Reducing Coccidiosis in California Quail During Captivity. California Fish and Game 28:148-149.

The Protozoan Blood Parasite *Haemoproteus lophortyx* O'Roke in Quail at the San Joaquin Experimental Range, California. California Fish and Game 28:150-153.

Coccidiosis in California Quail. Condor 44:168-171.

1943

The Occurrence of Blood Parasites in Birds From Southwestern United States. Jour. Parasitology 29:187-196.

Food Habits and Intensity of Coccidian Infection in Native Valley Quail in California. Jour. Parasitology 29:206-208.

Fungus Disease in a Glaucous-winged Gull. Condor 45:160-161. A parasite in the muscles of ducks in California. California Fish and Game 29:148-149.

Epidemiological Studies on Coccidiosis of California Quail. I. Occurrence of *Eimeria* in Wild Quail. California Fish and Game 29:168-179.

An Outbreak of Mycotic Pneumonia in Mallards. California Fish and Game 29:204.

Parasites of Cottontail Rabbits on the San Joaquin Experimental Range, California. Journal Wildlife Management 7:395-400.

Giardia in the Blood of a Kangaroo Rat. Journal Parasitology 29:423.

1944

Eyeworm (*Thelazia californiensis*) Infection in Deer in California. California Fish and Game 30:58-60.

A parasite from antelope in California. Transactions American Microscopical Society 63:27-29.

Notes on the pupal development of *Stilbometopa impressa* (Diptera Hippoboscidae). Journal Parasitology 30:112-118.

Preliminary arrangements have been made to obtain more adequate quarters to house the laboratory on the Berkeley Campus of the University of California. The achievement of this move will also afford better library facilities and cooperation with various specialists on the University faculty.

PITTMAN-ROBERTSON

As a direct result of the war the appropriations made by Congress under the Pittman-Robertson Act were considerably reduced during the biennium. This action on the part of Congress generally met with the approval of the States who were fearful that the manpower shortage, the lack of essential materials, and soaring land prices would make it impossible to spend normal appropriations.

As it was, California received allotments totaling $91,717.86, which brought the total of Pittman-Robertson money allotted to California since the inception of the program to $398,233.28. Since, according to the terms of the act, a participating State must contribute an amount equal to one-third of the Federal apportionment, the amount that has actually been made available for wildlife restoration in California is now more than one-half million dollars. Of this sum, $457,570.72 had been obligated at the close of the biennium.

Seventeen projects have been undertaken up to the present time. Eleven of these were begun during the 1940-42 biennium; six were completed during that period, and five were continued after July 1, 1942.

Four new projects were begun during 1942-44, bringing to nine the total number of projects on which work was done during the period covered by this report. Three of these projects came under the heading of surveys and investigations, four were development projects, and two involved the acquisition of lands.

Following is an account of the wildlife restoration work accomplished under each of the three project categories.

Surveys and Investigations

A five-year study of California's fur resources, Project 5-R, first undertaken early in the spring of 1941, was continued through this biennium. Particular emphasis was placed on the accumulation and analysis of both quantitative and qualitative data pertaining to California's annual fur crop. Although the shortage of manpower necessitated the discontinuance of intensive studies of the biology and management requirements of all of the various kinds of fur bearers in the State, it was possible to give some attention to two of the most important species, the beaver and the muskrat. The experimental planting of beaver has been generally so successful that plans are being made for an intensive beaver management program in the immediate future.

The investigation of methods that can be used in connection with valley quail management, Project 6-R, is another five-year study that was continued during the biennium. The general survey of the study area, California's south coast counties, was concluded early in this investigation and during the past two years emphasis was placed on the application of specific management tools such as water development, predator control, artificial feeding, and the like. The results of some of these studies have already been published and at the close of the biennium the manuscript of a well illustrated handbook entitled "How to Increase Valley Quail in California" was nearing completion. This promises to be an important contribution to game management literature.

Arguments, pro and con, over a winter deer season in the south coast and southern regions of the State in 1943 and minor though nonetheless heated contentions over the proper season for taking antelope have emphasized the lack of technical knowledge of the condition of the meat of big game at various times of the year. As a result, a scientific study of deer and antelope meat, Project 15-R, was begun early in 1944. So far, the investigation has been confined to deer from the north coast, Marin County, and the south coast, Ventura and Santa Barbara Counties. The study is being conducted in cooperation with the Department of Home Economics of the University of California. The university is responsible for the analyses of the meat samples and the division for the collection of specimens and recording of field data. Samples of the stomach contents of all deer taken are being analyzed by the U. S. Fish and Wildlife Service.

Development Projects

The restoration of sagehen habitat in Lassen and Modoc Counties through the development of springs and the creation of fenced meadows, Project 1-D, was begun in 1940 and was terminated during the fall of 1942. Nineteen units were completed, some of them in cooperation with the Division of Grazing, the A. A. A., or private landowners who contributed money, labor, or materials.

Project 7-D, providing for resurveying and posting the boundaries of legislative game refuges, operated for almost a year before the shortage of personnel occasioned by the war made it necessary to suspend operations for the duration.

The construction of new levees and the improvement of old, together with the installation of spillways and gates on the Gray Lodge Waterfowl Refuge near Gridley was made possible by the approval of Project 13-D. Two hundred twelve thousand, four hundred and ninety cubic yards of earth were placed on 12½ miles of levee. Over 1,000 feet of concrete culvert of varying diameters, 18-inch to 36-inch, were placed and 135.43 cubic yards of concrete were used in the construction of headwalls.

The construction of a drift fence approximately five miles long on the western boundary of the Tehama Deer Winter Range, Project 14-D, was begun in the spring of 1944 and was still under way at the close of the biennium. The purpose of the fence is to control trespass by domestic livestock.

Land Acquisition Projects

Both Project 10-L, Tehama Deer Winter Range, and Project 11-L, Honey Lake Valley Waterfowl Management Area, were continued through the biennium. Twelve hundred acres were added to the Tehama Range and three parcels of land totaling 1,447 acres have been added to the Honey Lake area.

BUREAU OF GAME FARMS

By August Bade, Chief

There are two very good reasons for the decline of 12 per cent in production and distribution of game birds for the biennium.

(1) Labor was not only scarce, but the quality of what was available was far below the level of ordinary years. In order to carry on in a comparable way to former seasons, women and high school students were employed as well as men well along in years.

(2) Early in 1942 it became apparent that the supply of protein would be cut about 50 per cent and that meant that all poultry and stock feeds would be affected. Since game birds are insect eaters their food, under domestic handling, must contain a high per cent of protein. With the lowering of the protein content of all commercial feeds, plus the inexperience of available help, the problem of producing game birds became involved.

USE OF MODERN EQUIPMENT

The introduction of more modern equipment such as the battery brooder went a long way in compensating for the food and labor situation. For the past two years we had been working with the battery brooder in an effort to utilize this type of equipment in the production of game birds. The conditions imposed by the war, labor and food, helped to make the development of the battery brooder an actuality in the rearing of all upland game birds.

Not only does the battery brooder multiply labor, but it increases both production and the quality of the birds. And the use of the battery does not mean that we are discarding the former radiant type brooder that has been developed here in California and is now used by many States, but it does mean that the battery supplements the work of the older brooder and makes it even more efficient. With the introduction of the battery brooder all radiant type brooders now in use will be kept and their work merely increased and improved.

THE REARING PEN PROGRAM

Even under war conditions the rearing pen program continues to meet with general approval and, while a few units quit for the duration other new units of pens were built and operated. At the beginning of the biennium we were serving 129 units and at the close that number had increased to 140. These cooperative efforts tend to increase interest in community affairs and lessen game law violations. The rearing pen program is educational as well as productive.

A TRAINING SCHOOL FOR GAME BREEDERS

The two-year course in game management at Humboldt State College, Arcata, continues, but the armed services requirements of

manpower has reduced the number of students who are able to take advantage of this course. As a substitute classes have been organized at the Yountville farm for the training of new employees as well as the older men who are left on the job.

Classwork at the Yountville farm includes lectures supplemented by moving pictures and general discussion. These classes are held at night and are available to all employees and others interested in conservation.

GAME MANAGEMENT AREA PROGRAM

With four years of experience behind us the game management program continues for the man who can afford a longer shooting season and is willing to pay for the privilege. The commercial game breeder has been provided with a market for his product at a price that shows him a profit.

Field trials are now held on these areas where actual hunting conditions may be emulated for all types of hunting dogs. During the four years that game management has been practiced a total of 27,547 game birds have been released (and all these birds came from commercial breeders), while only 12,980 birds have been retaken, or less than 50 per cent. Game management has given to the unattached sportsman 14,567 birds that did not cost him a single penny. A check on territories adjacent to game managed areas shows a decided increase in game birds. In some instances banded birds that were released on game managed areas have been taken by hunters during the regular shooting season as far as 18 miles from the point of release.

FIELD DOG TRIALS

The sport of field trials has to some extent suffered by war restrictions and the number of trials held during a normal year has decreased, but in many cases clubs have functioned regardless of these handicaps. Some clubs have built their own pens for the rearing of birds for field trials. This is a good indication of the growth of this sport in California. There is also a decided increase in the use of hunting dogs, which is a real conservation measure.

QUAIL TRAPPING PROGRAM

As far as manpower and equipment is available the quail trapping program goes ahead and in another year or so we will know more about this sort of work and its place in the general scheme of more upland game.

THE GENERAL PHEASANT SITUATION

The 1943 season brought complaints from many hunters that pheasants were not as numerous as in previous years. Various reasons were advanced for this condition, especially in the Sacramento Valley areas. Some thought it was due to a poor hatching season. Others were sure it came about because too many male birds were taken. A few were of the opinion that the opening of the quail season in advance of the regular pheasant season had resulted in much illegal shooting.

During the spring and early part of 1944 regular checks have been made all over the Sacramento Valley and other areas where there have been a concentration of hunters the year before and there is a very definite decline in the number of birds.

	Pheasants	*Partridges*	*Quail*	*Turkeys*
Birds distributed	94,064	21,792	5,680	311
Birds hatched	100,306	25,500	7,503	637
Eggs laid	159,558	33,378	15,592	1,461
Eggs set	131,702	32,123	10,999	1,305
Eggs distributed	3,144	155	1,103	

BUREAU OF PATROL AND LAW ENFORCEMENT

By L. F. Chappell, Chief

The operations of the Bureau of Patrol during the past biennium were greatly curtailed due to the loss of manpower, rationing of gasoline and rubber incident to the war activities. This was to be expected. No replacement of mobile equipment was possible and no new tires have been available for our use since 1941. This has necessitated very careful handling of equipment and a great deal of credit is due to the personnel of the bureau in carrying on the work as well as they have under these circumstances.

In addition to the wardens and assistant wardens which were on military leave and which were reported in the last biennium, the following employees in the bureau have taken military leave of absence during this biennium:

Wardens

Don Davison	5/ 4/44
Don Chipman	5/26/44
Harold Erwick	11/ 4/43
Owen Mello	9/14/44
H. S. Vary	5/17/43
Walter Greenwald	4/20/43
Larry Werder	3/ 4/43
Jay Cox	3/14/43
George Shockley	3/ 8/43
John Spicer	2/24/43
W. S. Talbott	1/29/43
A. L. Stager	1/ 1/43
John Hurley	12/ 7/42
Karl Lund	12/10/42
Walter Shannon	12/15/42
Leo Rossier	12/14/42
George Seymour	11/ 4/42
William La Marr	10/ 2/42
Chester Ramsey	10/20/42
John Barry	10/28/42
Carmi Savage	9/ 5/42
Garrie Heryford	9/28/42
Charles Towers	8/18/42
N. J. Millen	8/28/42
Howard Shebley	7/ 6/42

Captains

L. J. Weseth	9/ 2/43
Ralph Classic	7/30/43

Assistant Wardens

R. J. O'Brien	5/ 3/44
Robert Fraser	4/20/44
Frank Burns	4/11/44
Will Payne	3/31/44
Frank Felton	3/ 4/43
Glen Whitesell	10/30/42
Robert Hart	10/19/42
James Wade	9/12/42
Bolton Hall	9/30/42
Robert Kaneen	7/21/42
C. E. Whaley	7/17/42

Deckhands

Robert McDonald ---------- 3/ 9/43
Walter Scrimsher ---------- 11/ 1/42
Harry Peters ---------- 8/ 3/42

Diesel Engineman

Ralph Dale ---------- 10/20/42

Stenographer/Clerk

Ruth Smith ---------- 11/ 8/43

In addition to the above persons, the following members of the service resigned to enter other lines of work:

Resignations

Wardens

Ed Clements ---------- 1/25/44
E. L. Walker ---------- 3/14/44
R. J. Bullard ---------- 11/15/43
L. G. Van Vorhis ---------- 10/18/43
Kenneth Langford ---------- 4/29/43
Chester Parker ---------- 3/27/43
George Johnson ---------- 7/ 7/42
R. W. Remley ---------- 7/ 5/42

Assistant Wardens

Allen Swenson ---------- 8/ 2/42

Deckhand

M. G. Stewart ---------- 9/29/43

Ray O'Connor was placed on disability retirement in August of 1943 after 33 years of service with the division and E. A. Chan, former warden and later information clerk, went on disability retirement August 17, 1942 and passed away in April 1943.

Our ranks were further reduced by the deaths of the following wardens which occurred during the biennium:

Deaths

Alvin Granstrom ---------- 7/21/43
Charles Love ---------- 8/11/43
C. L. Bundock ---------- 6/ 5/43
A. R. Ainsworth ---------- 8/ 8/42

The patrol boat "Sturgeon" based at Monterey, and the patrol boats "Perch" and "Quinnatt III" based in the San Francisco Bay District were requisitioned by the United States Coast Guard in September, 1942. This equipment was sold outright to the War Shipping Administration after rather lengthy negotiations.

The patrol boats "Tuna," "Yellowtail" and "Broadbill" were chartered to the Coast Guard in August of 1942. Under the terms of this charter, we expect this equipment to be returned.

The only remaining patrol boat, the "Bonito" is operating in southern California waters.

To supplement the marine patrol in the bay area a 19-foot open launch was purchased in February of 1943, this boat being of shallow draft, makes it possible to cover more of the restricted waters in the bay area.

With the completion of the Shasta Dam and the storage of water at that point, it became evident that some method of patrol on this lake would be necessary as it opened up a great virgin country which heretofore had been inaccessible as there were very few trails and no roads leading into it. Accordingly the commission approved the purchase of a small launch for use on this reservoir. The purchase was completed in June of 1944.

A boat has been chartered for patrol work in Monterey Bay after it became evident that a more intensive coverage of these waters would be necessary.

Airplanes were used to some extent in northern California where military restrictions did not prevent their operation. During the hunting seasons for antelope and deer in Modoc and Lassen Counties, planes were used to a great extent and with very satisfactory results. This equipment will be a necessary and important part of the patrol activity after the war.

A summary and recapitulation of arrests and convictions will be found in the appendix on page 75.

REPORT OF THE BUREAU OF MARINE FISHERIES

By Richard Van Cleve, Chief

Total landings of fish, in pounds, for the State of California for the years 1942 and 1943 are shown in Table I, with the production of canned fish, fish meal and fish oil.

TABLE I

	1942	*1943*	*Total*
Total landings, pounds	1,171,514,793	1,229,754,615	2,401,269,408
Cases of canned fish	6,941,643	6,698,134	13,639,777
Tons of fish meal produced	79,003	86,151	165,154
Gallons of fish oil produced	12,686,640	14,016,179	26,702,819
Value of canned and processed fishery products	$67,432,689	$70,496,100	$137,928,789

The total landings in these two years were 416,172,000 pounds behind the landings in the previous biennium, but the total value of the fishery products produced was the highest ever recorded for this State. Shortage of labor resulted in a decrease of 29 per cent in the production of canned fish.

The value of the principal species of fish to the fishermen in the two years is shown in Table II.

TABLE II

Pounds and Value of Commercial Fish Landings in California—1942-43

	*1942**		*1943*	
Species	*Pounds*	*Value*	*Pounds*	*Value*
Sardine	969,747,099	$10,369,736	972,249,015	$10,781,440
Yellowfin tuna	41,466,614	3,823,857	49,261,328	4,880,540
Skipjack	38,735,228	3,334,608	28,893,784	2,582,850
Albacore	11,091,699	2,107,209	21,384,864	3,477,417
Bluefin tuna	12,844,564	1,158,514	10,178,768	967,562
Shark	3,468,290	1,150,497	3,729,246	1,933,173
Pacific mackerel	52,553,663	954,643	75,262,739	1,492,918
Salmon	6,616,216	827,403	6,581,076	1,227,624
Barracuda	3,454,537	332,757	3,775,278	656,372
Crab	2,414,086	282,778	2,315,338	353,287
Sole	3,155,757	228,635	4,782,379	265,203
Yellowtail	2,726,269	192,631	4,934,879	368,724
Spiny lobster	856,300	150,037	985,525	256,153
Sablefish	1,972,270	129,974	3,206,074	267,671
Bonita tuna	1,650,689	126,732	2,282,299	181,354
Rockfish	1,423,290	104,172	2,762,192	185,541
California halibut	756,065	102,422	1,121,673	238,670
Horse mackerel	5,348,501	101,606	12,698,974	235,878
Broadbill swordfish	445,908	94,217	336,386	102,430
Shad	2,571,633	84,459	2,348,143	114,648
White sea bass	553,726	78,995	500,183	122,797
Black sea bass	378,780	46,808	700,855	157,298
All others	8,291,042	427,356	19,489,950	1,101,219
Totals	1,172,522,226	$26,210,046	1,229,780,948	$31,950,769

* Landings for 1942 include shipments to canneries from other States and foreign countries to the value of $106,778.

The catch of fish sold in the fresh state was 30,092,000 pounds in 1942, and 37,683,000 pounds in 1943. The increase in 1943 occurred among a number of species, and probably reflects the adjustment of the industry to war conditions. Some of the fishing grounds which were closed in 1942 for defense purposes have again been opened. War emergency restrictions on the movements of boats into and out of ports have been somewhat relaxed, and readjustments in price ceilings have encouraged fishermen to again seek species which were formerly priced so low that it was unprofitable to bring them to port.

One of the most interesting developments of the biennium was the heavy catch of albacore during 1943. The catch of this species for this year was the highest recorded since 1925. The albacore fishery developed gradually after the last World War, along the California coast until in 1925 a catch of 22,206,923 pounds was landed. In 1926 the albacore catch fell to 2,469,385 pounds and did not again reach the 1925 figure until 1943. The catch in California is, now, only a part of the total present production of albacore on the coast, since a considerable fishery has developed off the coasts of Oregon and Washington in the last ten years.

COMMERCIAL FISHING LICENSES

The record of licensed commercial fishermen in California for the biennium, is shown in Table III.

TABLE III
Licensed Commercial Fishermen

Nativity	*1942-43 licensed fishermen*	*1943-44 licensed fishermen*
United States	5,346	7,893
Italy	1,197	1,374
Jugoslavia	940	909
Norway	461	360
Portugal	328	341
Great Britain	187	239
Sweden	85	94
Mexico	68	62
Spain	57	59
Denmark	45	61
Finland	45	56
Russia	45	64
Greece	44	51
Germany	34	55
Austria	29	--
France	21	23
Netherlands	--	28
All others	111	134
Total	9,043	11,803

It is of interest to note that while the number of fishermen dropped in the 1942-43 season, from the previous season, the number of commercial fishing licenses sold in the 1943-44 season was the largest ever recorded for this State. The decrease in 1942-43 was due in part to the loss of the Japanese fishermen who were barred from operations off the coast. These were only partially replaced by the other nationalities.

Interest in the lucrative albacore and soupfin shark fisheries, which were successful in 1943, as well as high prices of all fish, encouraged large numbers of people to enter the industry. However, commercial licenses were also bought by some solely to qualify for the Coast Guard passes required for movement of boats in ocean waters. An unknown number of licenses must be classified as temporary, and do not represent a permanent increase in the number of commercial fishermen in the State.

Some idea of the distribution of the increase within the State may be obtained from Table IV which shows the number of commercial fishermen registering as residents of the different ports.

TABLE IV

Region of Residence	*1942-43*	*1943-44*
Eureka	213	315
Sacramento	367	442
San Francisco	927	1,347
Monterey	994	968
Santa Barbara	306	276
Los Angeles	4,379	6,536
San Diego	1,391	1,552
Alaska, Washington, and Oregon	466	354
Mexico	—	13
Total	9,043	11,803

SARDINES

The catch of sardines is reported on a seasonal basis, the season in northern California extending from August 1st to February 15th, and that in southern California from October 1st to March 1st. The details of the production are given in the catch circulars which are reprinted in the appendix. The total production of sardines and sardine products is shown in Table V for the two seasons of the biennium.

TABLE V

Sardines (seasonal record)	*1942-43*	*1943-44*
Total tons landed	501,341	473,522
Tons received for canning	271,703	231,527
Total cases of all size cans packed	3,743,373	3,160,701
Number of reduction permits issued	76	75
Permit tonnage granted	378,634	370,272
Number of tons used under permit	229,334	241,733
Tons of sardine meal produced	76,983	73,512
Gallons of sardine oil produced	13,148,783	13,783,011

A further increase in the number of reduction permits over the previous biennium is noted. Furthermore, a decrease in the total case pack from the record established in the 1941-42 season also occurred. The catch in both years was below that of 1941-42. During the 1941-42 season, an overall average of 9.2 cases of sardines were packed for every ton of sardines landed. In the 1942-43 season this case pack had fallen to 7.5 per ton; and decreased still further in 1943-44 to 6.7 cases per ton. While the decrease in catch of the last year of the biennium amounted to 5.5 per cent over the first year of the biennium, only 49 per cent of the last year's catch was received for canning, whereas 54 per cent of the first year's catch was received for this purpose. The decrease in pack was due not only to the decrease in catch. There is no doubt that the high prices

of meal and oil, as well as the shortage of cannery labor, also contributed to the diversion of a greater proportion of the fish into the reduction plants.

Allocation

The decrease in the canned pack of the last year of the biennium occurred in spite of the complete regulation of the fishing and utilization of sardines by the Federal Government under the so-called "allocation orders."

After the beginning of hostilities, and with the beginning of the 1942-43 season, it was apparent that some outside agency would have to enter the sardine picture in order to prevent a major loss in production. The sardine fishing fleet had been reduced in size by the loss of large numbers of the sardine boats to the Army and the Navy. Those plants owning boats naturally desiring to ensure their own catch prevented the sale of the catch of their boats to other plants and in other ports. As a result some plants at times had an excess of fish, most of which was diverted to reduction while other canners were unable to obtain enough fish to operate their plants. During periods of heavy fishing the boat loads were limited by the plants to keep the landings within the owner's production capacity.

An attempt was made by the California Division of Fish and Game to remedy this situation; and the first order of the commission was issued on August 22, 1942, to prevent the loss of boat production by imposition of catch limits and to distribute the fishing fleet between the three California sardine ports in proportion to their plant capacities. Several months were required to solve the numerous problems involved in the inauguration of such a radical departure from normal fishing operations; and the commission was unable to put allocation into operation before injunction proceedings, instituted by several sardine plant operators in the port of Monterey, forced the cessation of allocation activities. Allocation was then taken over by the War Production Board which had cooperated closely with the commission in its early attempts to organize the allocation program. The War Production Board carried through allocation to the end of the 1942-43 season.

During the period between the end of that season and the beginning of the 1943-44 season, the office of the Coordinator of Fisheries was established in the Department of the Interior within the personnel of the U. S. Fish and Wildlife Service. This organization took over allocation at the beginning of the 1943-44 season. The imposition of limits on the boat catches was prohibited. Boats were licensed to fish in certain ports in an attempt to distribute an inadequate fleet equitably between the three fishing ports in California, to obtain the greatest possible production from them. Poor fishing experienced in the ports of Monterey and San Francisco during the months of October, November, and December, however, made it impossible to maintain the distribution of boats on an equitable basis and the canned pack fell to the lowest figure reached in the last three years.

Sardine Investigations

Although sardine investigations have been curtailed due to lack of personnel, the essential phases are being continued. During each season the daily catch has been sampled so that there will be no break in the

continuity of studies of size changes of fish. The age-analysis of the catch has been carried on through a cooperative study with the U. S. Fish and Wildlife Service. No sardines were tagged during this biennium, but tags were recovered from former releases. In the 1942-43 season, 1,328 tags were recovered in the California fishery, and eight in the Pacific northwest. In 1943-44, 648 tags were returned in California, and 52 in the Pacific northwest. These represent recoveries from groups released in previous years off the coast of Mexico, Southern California, Monterey and San Francisco. In addition, 78 recoveries were made in California of tags released off the mouth of the Columbia River by the Oregon Fish Commission, and three were taken which had been released by the Fisheries Research Board of Canada off the Washington coast.

Analyses have been continued of the fisherman's catch per unit of effort expended. These studies, together with the age readings and length measurements, indicate that at present the sardine population is in a comparatively healthy condition due to good spawning survival in 1937 and 1939. These two year-classes have been the main support of the fishery for the past three or four seasons.

Annual meetings with representatives of fisheries departments of Canada, Washington, Oregon, California, and the U. S. Fish and Wildlife Service have been held to coordinate the sardine investigations of the fisheries staffs of Canada, and the Pacific Coast States.

TUNA

The landings in pounds of tuna at California ports for the years 1940 through 1943 are as follows:

TABLE VI

	1940	*1941*	*1942*	*1943*
Albacore	3,885,000	2,747,000	10,621,000	21,385,000
Bonito	5,291,000	10,177,000	1,651,000	2,282,000
Bluefin	19,970,000	9,519,000	12,845,000	10,179,000
Skipjack	56,650,000	25,585,000	38,715,000	28,894,000
Yellowfin	113,760,000	76,702,000	41,167,000	49,261,000
Total	199,556,000	124,730,000	104,999,000	112,001,000

MACKEREL

The catch of mackerel in 1942 was 52,353,663 pounds. In 1943 it rose to 75,261,000 pounds. A shortage of fish in 1942 added to the difficulties of movement of the boats in and out of the harbors in Southern California, resulted in the lowest mackerel catch that has been recorded in 10 years. The canning season, which is determined only by the availability of fish, began in September, 1942; and extended for that season only to March, 1943. The latter part of this season was characterized by the presence of large numbers of fish which were too small for the canners to handle properly. In 1943-44 the return in large numbers of the 1942 yearlings resulted in a major increase in the catch. As two-year olds, these fish were satisfactory for canning. The 1943-44 season started in August, and ended in February.

Mackerel Investigations

The loss of the staff working on Central Valleys and salmon investigations required another shift in the personnel. It has been necessary to suspend most of the mackerel investigations and to shift that personnel to the salmon work. Sampling of the mackerel catch has been maintained at San Pedro and at Newport.

Mackerel tagging was greatly reduced. From November, 1942, to March, 1943, 2,474 fish were tagged at Catalina, 1,361 at Newport, and 2,536 in Santa Monica Bay.

The numbers of mackerel tags recovered from different sections of the coast during the biennium are shown in the table below.

TABLE VII

	1942-43 Recovered		*1943-44 Recovered*	
Released	*Central Calif.*	*Southern Calif.*	*Central Calif.*	*Southern Calif.*
Oregon	—	—	—	1
Central California *	5	23	—	5
Southern California †	10	399	29	237
Mexico ‡	3	75	5	28
Total	18	497	34	271

* Monterey to San Francisco
† Santa Barbara to San Diego
‡ West Coast Lower California

CENTRAL VALLEYS AND SALMON INVESTIGATIONS

Tagging

Salmon tagging with numbered celluloid button tags fastened below the dorsal fin was started off the coast of California in 1939 and was carried through the fall of 1942. A total of 1,765 fish were tagged from chartered trolling boats in 1942. Sufficient personnel was not available to expand the effort required to obtain quantitatively significant returns. Only 143 tags were recovered in 1942, and 31 in 1943. Salmon have been retaken that have borne their tags for three years.

Migrant Counts

Counts of the adult salmon were made in 1942 on the following streams: Trinity River at Hoopa, American River at Folsom Dam, as well as at a rack established near Sacramento, the Tuolumne River at Modesto, and on the Mokelumne River at Woodbridge Dam. Estimates of numbers spawning in the San Joaquin River were made by surveys of the spawning areas below Friant Dam.

The 1942 estimates and counts made on these rivers are as follows:

Tuolumne River	44,494
American River (Folsom)	1,888
Mokelumne River (Woodbridge)	12,119
Trinity River	1,137
San Joaquin (approximate)	6,000

None of these counts except that on the Tuolumne are considered to be accurate. The count on the Trinity depended upon the installation of a weir by the Indians at the Hoopa Indian Reservation. The weir was not installed until late in the year; and it washed out with the first large freshet. No estimate of the run that passed this point, either before or after the weir was in place, was obtained.

In 1943 no one was available to make a count on the Tuolumne River. An estimate of the number of fish that ran up the San Joaquin River and spawned below Friant was again made. Approximately 7,000 fish were counted on the spawning beds in this area. From similar counts made in other streams where check counts at weirs were available indicate that this must be considered a minimum estimate of the numbers of fish present in the upper San Joaquin.

A trap was installed on the American River below the spawning grounds and the run in that stream was estimated by tagging fish at this trap and later comparing proportions of tagged and untagged fish on the spawning beds. Heavy spring and fall freshets preclude the possibility of obtaining complete counts of migrants remaining below Folsom Dam. The 1943 run was estimated to total 7,000 fish by this method.

Fyke Net Work

Fyke nets were operated to determine the numbers of salmon fry lost in various diversion canals. Nets were also run in the rivers near the intake of those canals tested to check the time and size of the downstream migration.

From May 1st to June 9, 1943, nets were operated in the Sacramento River (near Chico), the Glenn-Colusa Canal, the Feather River (near Oroville), the Sutter-Butte Canal, and the Great Western Canal. The movement of young salmon was evidently early, and most of them had moved out of the rivers by the time the ditches began taking water. Results obtained can not therefore be considered significant.

In 1944 the work was started earlier with an earlier start of the irrigation season. On the Feather River (near Gridley) nets were operated from January 23d to May 31st. The heaviest downstream movement of young salmon occurred during March and April. The Sutter-Butte Canal opened early in April and moderate numbers of salmon were taken in the canal between mid-April and the end of May. The Great Western Canal opened in mid-April and took very few salmon. These catches were again affected by variations in stream flow and the difficulty of operating fyke nets in irrigation canals. They must be repeated to determine the significance of the results obtained. Both of these canals divert water from the Feather River.

On the San Joaquin River near Mendota the fyke nets were operated from January 19th to July 16th. Four large canals and one small one leave the river at this point. At least one canal diverts water at all times. By March 7th of 1944 all canals were operating.

The migration of young salmon down the San Joaquin was heavy from January 27th through March, and reached its peak on February 24th. The canals diverting water at Mendota did no appreciable damage until February 11th, but from that time on the loss of young salmon was heavy. On February 18th one fyke net took 3,000 young salmon from one canal.

Shasta Salvage Operations

In November of 1942 the fall run of adult salmon was blocked for the first time at Shasta Dam when construction reached the point where it was no longer possible to take the fish over. From that time on the salvage program of the U. S. Bureau of Reclamation was in full operation.

The salmon run reaching the vicinity of the Shasta Dam after November, 1942, was forced to spawn in the river below this point. The entire fall run in 1943 spawned in the river below Keswick and the spring runs of 1943 and 1944 were transferred into Deer Creek and Battle Creek. It is too early as yet to determine how successful the salmon maintenance program below Shasta is. This will only become evident when fish that have been produced by the runs blocked by Shasta Dam and have been handled by the salmon maintenance program operated by the U. S. Fish and Wildlife Service for the Bureau of Reclamation, return again to the fishery and to the river areas in which they were produced. The first effects of the salvage operation should become evident in the fall of 1946; and the full effect of the salvage operations on the fall run will be felt in 1947.

SOUPFIN SHARK

The decrease in the production of soupfin shark, noted in the previous biennium, continued during the present biennium. Total landings for 1942 and 1943 were 3,468,290 and 3,722,729 respectively. This decline in landings occurred in spite of an increased fishing effort and the greater efficiency of the various types of nets used. The effort required to catch one shark has increased 27 times from 1942 to 1944.

An investigation of the Vitamin A potency of the soupfin shark and its relationship to the biology of the species was continued. From July 1, 1942, to July 1, 1944, samples of 461 livers were collected and analyzed at Stanford University. During 1943 the fishery was observed; and samples of the catch were obtained along the entire coast of California. Data obtained is being analyzed, and a report is being prepared for publication.

The observations of the catch have indicated that in Southern California the fisherman's catch is composed almost entirely of female soupfin. In contrast to this, male soupfin appear to be concentrated in the northern waters of the State. It has been established that the vitamin potency of the soupfin shark increased with size, and in the female definite relationship of Vitamin A potency to the state of sexual maturity, as well as the sexual development of the individual, has been found. In both males and females immature individuals exhibit very low vitamin potencies and their total value in terms of Vitamin A is small. On attaining maturity, however, the vitamin potency increased rapidly with size. This change from low potency to high potency livers begins in males at a total length of about 155 centimeters, and in females at a total length of about 165 centimeters.

OYSTERS

After some years of trying to cultivate native oysters (*Ostrea lurida*), in Humboldt Bay, it has been finally demonstrated that it is impractical. Following the closure of the last company attempting this, the commission rescinded its previous regulations closing the bay to the introduction of Pacific oysters (*Ostrea gigas*). The bureau is planning to make some experimental plants of this large Pacific oyster to determine the possibility of inducing it to reproduce in this area.

Oyster cultivation was carried on successfully, especially at Morro Bay; but within the last year operations of the Army Engineers in

dredging channels through the bay indicate that it may be difficult to continue to maintain these beds unless these plans are held within the bounds of reason.

ABALONES

Early in the biennium most of the abalone divers had moved from Monterey to Southern California, south of Point Conception, where they worked on the collection of agar weed, or *Gelidium*. After this southern coast was opened to abalone diving by the 1943 Legislature, they fished for green abalones. The small size of this species and increasing difficulties in gathering *Gelidium* made the venture unprofitable. By the end of the biennium most of the divers had moved back to Morro Bay. The two years' rest given to the abalone beds in District 18 while the divers were in Southern California has resulted in a plentiful supply of large abalones.

STATISTICS

Continued shortage of personnel has required a modification of operations in the statistical system. Insofar as possible, the collection of basic material has been continued, although difficulty has been experienced in obtaining an adequate field check to maintain the accuracy of the records. The inadequate clerical help has made it necessary to drop most of the special analyses that were heretofore published annually. The basic records, however, have for the most part been obtained; and these analyses can be brought up to date as soon as the employment situation recovers.

REPORT OF THE BUREAU OF ENGINEERING

By John Spencer, Chief

The activities of the bureau were, as in other lines, curtailed by the war. Routine inspections and investigations were carried on and consideration was also given to the future operations when more nearly normal conditions will prevail.

Investigations and some construction were carried on where it was permitted by the Federal agencies. The major portion of this activity was for the Bureau of Game Conservation in connection with their administration of the Pittman-Robertson Projects. When what appears to be suitable projects are found, a preliminary survey is made, and the data thus obtained determines its possible benefits to game. Six surveys of this kind were made, the data worked up and submitted to the Bureau of Game Conservation. In time some of these will probably receive further consideration.

The Tehama Winter Deer Refuge in Tehama County, comprising 25,000 acres, was surveyed, specifications were issued for fencing the exterior boundaries, and the contract was awarded. The work, however, has been under the supervision of the Bureau of Game Conservation.

About 10 miles west of Gridley is the commission's Gray Lodge Waterfowl Refuge of 2540 acres. This refuge did have a system of levees but these were improved and made more effective, and substantial water control facilities and improvements were added. The levees, which are of sufficient width for vehicle travel, required the placing of 212,000 cubic yards of material and totaled 12½ miles in length. Some further work is to be done when present war restrictions will permit.

Several projects are under consideration in Lassen County. One purchase of 2,200 acres has been made for waterfowl purposes and surveys are now in progress, and the intent is to proceed with the needed and extensive improvements in 1945 if it is permitted under the war regulations.

The bureau has not had the proper facilities for storing its construction equipment and supplies. When material for construction is available it is expected to provide these facilities on land that has been purchased in the City of Redding as that place will be equipment headquarters for central and northern sections of the State.

The regular inspection of fish screens, previously installed, has continued, the 1,500 inspections made have well demonstrated that fish screens, as designed and installed, do stop the fish from entering the water diversions and subsequently being destroyed, and at the same time the continued flow of water is not stopped or interfered with. No new fish screens have been installed.

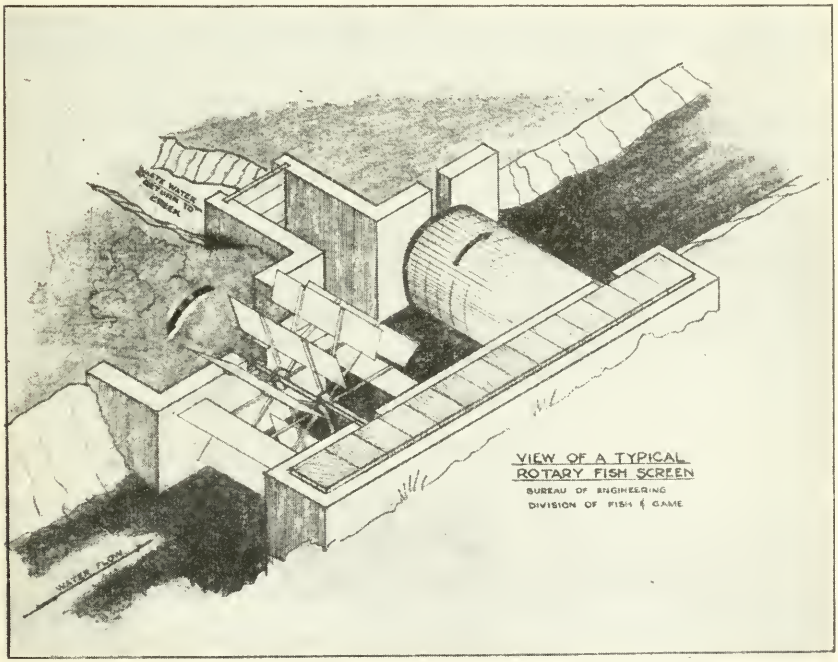
Four new fishways over or around dams have been constructed by the owners of these dams. These installations were made due to commitments made by the owners to the writer in the preceding biennium. Over 250 inspections of dams and existing fishways were made to see if improvements or repairs were required. Twelve fish ladders were

repaired. The bureau has recommended to the executive secretary the installation of a number of fishways or their repair.

Special matters requiring investigations numbered 104, while 160 maps or plans were prepared.

In the spring of 1941, the greater portion of the responsibility for the work in connection with fish screens and fish ladders was placed in other bureaus, and the obligations and responsibilities of the Chief of the Bureau of Engineering were not definitely defined and hence no further report on these subjects is made.

The subject of fish screens, and to a somewhat lesser degree that of fish ladders, has been before the commission for many years. Some progress has been made though the rate is far from satisfactory. It does not appear that there is sufficient knowledge of the need for protecting fish from the water diversions of the State by the ones who should be interested in this subject and this apparent lack benefits those who are opposed to an active and definite program with respect to these two matters. The problem of fish protection is probably more acute in this State than in some other States due to limited rainfall in certain areas and the numerous and large diversions of water made for agricultural, industrial, domestic and power purposes.


WASTE WATER RETURNED TO CANAL
WATER FLOW
VIEW OF A TYPICAL ROTARY FISH SCREEN
BUREAU OF ENGINEERING
DIVISION OF FISH & GAME

A number of agencies diverting water, and others, profess to believe that the problem has no solution, and appear to be of the belief that some one fish screen, yet to be found, is necessary before the great loss of fish through these unprotected water diversions can be stopped. The fact that this commission has had installed a number of successful

fish screens of different types for varying conditions is carefully ignored. The need is not for some visionary and undemonstrated fish screen but rather the application of the knowledge at hand and which has been available for some years.

It should be kept in mind that fish screens and fish ladders concern themselves with water, a vital need in the State of California. A policy of dealing with the diverters of water and the owners of dams should be determined based on a broad understanding of the needs of these parties as well as a reasonable application of fish protection measures, looking toward cooperation with those with whom the commission must deal in the application of the Fish and Game Code in these subjects.

In order that a defined policy be effective and reasonable in its operation, it appears that the responsibility should be fixed in one person. Several people can not be engaged in this work and have it carried out in an orderly and economical manner.

The subject of fish screens and fish ladders is a most important one in conservation work and it is recommended that conservationists give this subject their earnest and active consideration.

REPORT OF THE BUREAU OF LICENSES

By H. R. Dunbar, Chief

The biennium from July 1, 1942, to June 30, 1944, has presented many problems in the distribution and sale of licenses. Due to the various wartime restrictions, license sales have decreased and we have lost many of our license agencies as they were unable to obtain merchandise, or the lack of help caused them to discontinue handling licenses for the duration.

In past years, it has been difficult to maintain proper distribution of licenses in the northern counties of the State and at times the sportsmen found it difficult to purchase their licenses. In July of 1942, an office was established at Redding. This office served all cash agents in Trinity, Siskiyou, Shasta, Tehama, Modoc, and Lassen Counties. The office also serves as headquarters for the Patrol captain for the same territory.

In the distribution and sale of our licenses and tags, the license agents who conduct sporting goods, hardware, and various types of businesses, play an important part in assisting the division in making it possible for the sportsmen to obtain their licenses throughout the State. To simplify the work of the agents, the style of the license book was changed by eliminating the separate application form and incorporating it with the license stub. This has saved the agents considerable time and work, and they are well pleased with the change.

For various reasons as a result of the war, our license sales have decreased from the sale in 1941. Gasoline rationing and areas closed to hunting have been important factors in the decrease in sales. During the 1942 deer hunting season, all of Southern California and coastal areas were closed to hunting except the area north of San Francisco, which area was opened from August 1st to August 21st. In 1942, the deer tag sale dropped from a total of $173,699 in 1941 to $116,121. Hunting licenses dropped from $643,700 in 1941 to $522,985 in 1942. During the 1943 deer hunting season, the same areas were closed as in 1942 although in the month of December hunting was permitted in Southern California and the coastal area south of San Francisco. This resulted in an increase in deer tag sales from $116,121 in 1942 to $147,755 in 1943.

During the 1943 Session of the Legislature, a law was approved providing for a pheasant tag costing $1. Due to priorities and other causes, it was not possible to obtain a suitable type of tag. A cardboard tag, similar to the deer tag, was finally adopted. Approximately $121,000 in tags were sold.

The annual antelope drawing, as provided by Section 1346, was held at Sacramento on August 13, 1943. In all, 3,653 persons made application. Of the first 500 applicants who were entitled to a permit, 379 made application and were issued a permit. The 500th or last permit was issued to the applicant whose drawing number was 716.

The commission, in compliance with Section 1347, provided for an elk season in Inyo County in the fall of 1943. A drawing similar to that held for antelope was held at the Fish and Game office at Los Angeles on November 8, 1943. There were 2,837 applications received. Permits were issued to the 75 applicants who qualified at the drawing.

FINAL STATEMENT OF ANGLING LICENSE SALES, 1942 SERIES

County	Citizen, $2 each	Non-resident, $3 each	Alien $5 each	Duplicate, 50c each	Total
Alameda	$65,730 00	$48 00	$575 00	$39 00	$66,392 00
Alpine	328 00	183 00			511 00
Amador	1,678 00	6 00	5 00	2 00	1,691 00
Butte	9,662 00	39 00		13 00	9,714 00
Calaveras	1,862 00			3 00	1,865 00
Colusa	1,432 00		10 00	1 00	1,443 00
Contra Costa	21,232 00	48 00	205 00	18 00	21,503 00
Del Norte	3,194 00	258 00	5 00	10 00	3,467 00
El Dorado	4,696 00	144 00	10 00	5 00	4,855 00
Fresno:					
Agents	22,554 00	3 00	45 00	7 00	22,609 00
Fresno Branch	516 00	30 00	230 00	18 50	794 50
Totals, Fresno	$23,070 00	$33 00	$275 00	$25 50	$23,403 50
Glenn	1,082 00	6 00	5 00	2 00	1,095 00
Humboldt	12,606 00	87 00	115 00	28 00	12,836 00
Imperial	2,752 00	3 00		3 50	2,758 50
Inyo	12,256 00	171 00	70 00	21 50	12,518 50
Kern	11,252 00	6 00	5 00	4 00	11,267 00
Kings	2,902 00		30 00	1 50	2,933 50
Lake	3,500 00	9 00	5 00	5 50	3,519 50
Lassen	4,644 00	54 00	25 00	3 50	4,726 50
Los Angeles:					
Agents	202,588 00	174 00	160 00	76 50	202,998 50
Los Angeles Branch	564 00	120 00	620 00	75 50	1,379 50
Terminal Island Branch	86 00	6 00	55 00	9 00	156 00
Totals, Los Angeles	$203,238 00	$300 00	$835 00	$161 00	$204,534 00
Madera	3,892 00	9 00	5 00	6 00	3,912 00
Marin	10,094 00	3 00	100 00	7 00	10,204 00
Mariposa	4,506 00	114 00		15 00	4,635 00
Mendocino	8,484 00	9 00	5 00	2 00	8,500 00
Merced	4,718 00	9 00	30 00	10 00	4,767 00
Modoc	2,826 00	153 00		2 50	2,981 50
Mono	7,242 00	486 00	5 00	26 00	7,759 00
Monterey:					
Agents	8,902 00	9 00	310 00	13 50	9,234 50
Monterey Branch			75 00		75 00
Totals, Monterey	$8,902 00	$9 00	$385 00	$13 50	$9,309 50
Napa	9,040 00	15 00	30 00	9 00	9,094 00
Nevada	5,972 00	504 00	35 00	21 00	6,532 00
Orange	20,114 00	24 00		3 00	20,141 00
Placer	6,218 00	90 00	10 00	5 00	6,323 00
Plumas	7,440 00	123 00	65 00	23 50	7,651 50
Riverside	11,396 00	12 00	10 00	8 00	11,426 00
Sacramento:					
Agents	27,408 00		335 00	7 50	27,750 50
Sacramento Branch	454 00	102 00	1,320 00	64 00	1,940 00
Totals, Sacramento	$27,862 00	$102 00	$1,655 00	$71 50	$29,690 50
San Benito	1,032 00		10 00	3 00	1,045 00
San Bernardino	32,546 00	129 00	45 00	26 00	32,746 00
San Diego:					
Agents	52,614 00	201 00	5 00	1 50	52,821 50
San Diego Branch	92 00	81 00	80 00	12 00	265 00
Totals, San Diego	$52,706 00	$282 00	$85 00	$13 50	$53,086 50
San Francisco:					
Agents	58,166 00	12 00	530 00	22 50	58,730 50
San Francisco Branch	592 00	126 00	2,375 00	110 50	3,203 50
Totals, San Francisco	$58,758 00	$138 00	$2,905 00	$133 00	$61,934 00
San Joaquin	21,328 00	12 00	15 00	14 00	21,369 00
San Luis Obispo	9,078 00	3 00	10 00	17 50	9,108 50
San Mateo	9,254 00		45 00	8 50	9,307 50
Santa Barbara	7,552 00	6 00	20 00	13 50	7,591 50
Santa Clara	18,454 00	15 00	75 00	19 50	18,563 50
Santa Cruz	7,876 00	12 00	185 00	14 00	8,087 00
Shasta:					
Agents	11,744 00	63 00	15 00	30 00	11,852 00
Redding Branch	20 00	9 00	5 00	4 00	38 00
Totals, Shasta	$11,764 00	$72 00	$20 00	$34 00	$11,890 00

FINAL STATEMENT OF ANGLING LICENSE SALES, 1942 SERIES—Continued

County	Citizen, $2 each	Non-resident, $3 each	Alien, $5 each	Duplicate, 50c each	Total
Sierra	$1,394 00	$15 00		$2 00	$1,411 00
Siskiyou	9,358 00	369 00	$25 00	9 50	9,761 50
Solano	21,914 00	12 00	310 00	58 00	22,294 00
Sonoma	17,872 00	18 00	160 00	22 00	18,072 00
Stanislaus	11,954 00	24 00	60 00	18 00	12,056 00
Sutter	2,518 00			7 50	2,525 50
Tehama	2,940 00	6 00		5 50	2,951 50
Trinity	1,384 00	6 00	5 00	2 50	1,397 50
Tulare	11,316 00	27 00	35 00	9 50	11,387 50
Tuolumne	3,784 00		5 00	7 50	3,796 50
Ventura	7,092 00			4 50	7,096 50
Yolo	2,820 00			2 00	2,822 00
Yuba	6,242 00	36 00	30 00	7 00	6,315 00
Out of State:					
Arizona	568 00	228 00			796 00
Nevada		4,392 00		50	4,392 50
Oregon	142 00	99 00			241 00
Totals	$857,468 00	$8,958 00	$8,555 00	$1,022 50	$876,003 50
Number	428,734	2,986	1,711	2,045	

FINAL STATEMENT OF MARKET FISHERMAN LICENSE SALES, 1942 SERIES

County Licenses $10 each	Total
Contra Costa	$1,200 00
Del Norte	210 00
Humboldt	2,240 00
Los Angeles—Terminal Island Branch	47,590 00
Mendocino	1,000 00
Monterey Branch	11,110 00
Sacramento Branch	1,350 00
San Diego Branch	13,960 00
San Francisco Branch	12,000 00
Santa Cruz	790 00
Sonoma	270 00
Total	$91,720 00
Number	9,172

FINAL STATEMENT OF ANGLING LICENSE SALES, 1943 SERIES

County	Citizen, $2 each	Non-resident, $3 each	Alien, $5 each	Duplicate, 50c each	Total
Alameda	$68,956 00	$45 00	$800 00	$14 50	$69,845 50
Alpine	260 00	204 00			464 00
Amador	1,714 00	3 00		2 50	1,719 50
Butte	10,152 00	57 00	30 00	27 50	10,266 50
Calaveras	2,094 00	3 00	5 00	50	2,102 50
Colusa	1,346 00	3 00	5 00	3 50	1,357 50
Contra Costa	23,988 00	27 00	260 00	25 50	24,300 50
Del Norte	2,380 00	294 00		6 50	2,680 50
El Dorado	4,336 00	114 00	10 00	5 00	4,465 00
Fresno:					
Agents	21,442 00	15 00		6 00	21,463 00
Fresno Branch	706 00	39 00	235 00	25 50	1,005 50
Totals, Fresno	$22,148 00	$54 00	$235 00	$31 50	$22,468 50
Glenn	1,458 00	9 00	10 00	2 50	1,479 50
Humboldt	12,490 00	51 00	60 00	27 50	12,628 50
Imperial	2,282 00	3 00		50	2,285 50
Inyo	10,522 00	219 00	80 00	26 00	10,847 00
Kern	11,388 00			3 50	11,391 50
Kings	3,012 00		35 00	1 00	3,048 00
Lake	5,608 00	9 00	5 00	6 50	5,628 50
Lassen	4,510 00	39 00	45 00	5 00	4,599 00
Los Angeles:					
Agents	193,988 00	117 00	90 00	56 00	194,251 00
Los Angeles Branch	614 00	90 00	435 00	43 00	1,182 00
Terminal Island Branch	186 00	6 00	30 00	6 50	228 50
Totals, Los Angeles	$194,788 00	$213 00	$555 00	$105 50	$195,661 50
Madera	3,578 00			3 00	3,581 00
Marin	12,736 00	3 00	75 00	18 50	12,832 50
Mariposa	2,532 00	69 00	5 00	6 50	2,612 50
Mendocino	7,122 00	15 00		5 50	7,142 50
Merced	5,082 00	9 00	25 00	9 50	5,125 50
Modoc	2,718 00	159 00	5 00	6 00	2,888 00
Mono	5,556 00	561 00	5 00	15 50	6,137 50
Monterey:					
Agents	10,342 00	3 00	405 00	18 00	10,768 00
Monterey Branch		6 00	135 00		141 00
Totals, Monterey	$10,342 00	$9 00	$540 00	$18 00	$10,909 00
Napa	9,460 00	6 00	20 00	14 50	9,500 50
Nevada	4,940 00	555 00	65 00	11 00	5,571 00
Orange	19,068 00	9 00		3 50	19,080 50
Placer	5,864 00	48 00	25 00	4 50	5,941 50
Plumas	6,666 00	171 00	65 00	16 50	6,918 50
Riverside	12,522 00	12 00	10 00	14 50	12,558 50
Sacramento:					
Agents	29,710 00		665 00	11 00	30,386 00
Sacramento Branch	468 00	90 00	855 00	55 00	1,468 00
Totals, Sacramento	$30,178 00	$90 00	$1,520 00	$66 00	$31,854 00
San Benito	1,180 00	3 00	20 00	8 00	1,211 00
San Bernardino	41,074 00	51 00	50 00	33 50	41,208 50
San Diego:					
Agents	59,314 00	204 00		3 00	59,521 00
San Diego Branch	114 00	48 00	95 00	24 50	281 50
Totals, San Diego	$59,428 00	$252 00	$95 00	$27 50	$59,802 50
San Francisco:					
Agents	60,022 00	6 00	615 00	24 00	60,667 00
San Francisco Branch	726 00	117 00	1,390 00	74 50	2,307 50
Totals, San Francisco	$60,748 00	$123 00	$2,005 00	$98 50	$62,974 50
San Joaquin	23,980 00		115 00	21 00	24,116 00
San Luis Obispo	11,944 00	3 00	40 00	23 00	12,010 00
San Mateo	8,636 00	6 00	45 00	5 00	8,692 00
Santa Barbara	7,510 00	6 00	70 00	9 50	7,595 50
Santa Clara	19,402 00		175 00	16 50	19,593 50
Santa Cruz	6,788 00	9 00	385 00	19 00	7,201 00
Shasta:					
Agents	10,302 00	57 00	45 00	10 50	10,414 50
Redding Branch	182 00	27 00	55 00	7 50	271 50
Totals, Shasta	$10,484 00	$84 00	$100 00	$18 00	$10,686 00

FINAL STATEMENT OF ANGLING LICENSE SALES, 1943 SERIES—Continued

County	Citizen, $2 each	Non-resident, $3 each	Alien, $5 each	Duplicate, 50c each	Total
Sierra	$1,262 00	$21 00		$1 50	$1,284 50
Siskiyou	10,542 00	513 00	$180 00	9 50	11,244 50
Solano	24,990 00	9 00	570 00	56 00	25,625 00
Sonoma	18,426 00	15 00	225 00	29 50	18,695 50
Stanislaus	15,372 00	12 00	90 00	14 50	15,488 50
Sutter	2,594 00			3 50	2,597 50
Tehama	2,968 00		10 00	4 50	2,982 50
Trinity	1,400 00	3 00		3 50	1,406 50
Tulare	11,110 00	6 00		5 00	11,121 00
Tuolumne	3,454 00	24 00		7 00	3,485 00
Ventura	8,662 00	3 00		3 50	8,668 50
Yolo	3,120 00	30 00	5 00	6 00	3,161 00
Yuba	4,532 00	6 00		6 00	4,544 00
Out of State:					
Arizona	378 00	279 00			657 00
Nevada		3,732 00			3,732 00
Oregon	28 00	78 00		50	106 50
Totals	$881,808 00	$8,331 00	$8,675 00	$968 00	$899,782 00
Number	440,904	2,777	1,735	1,936	

FINAL STATEMENT OF MARKET FISHERMAN LICENSE SALES, 1943 SERIES

County $10 each	Total
Contra Costa	$2,040 00
Del Norte	120 00
Humboldt	2,130 00
Los Angeles	68,490 00
Mendocino	1,000 00
Monterey	9,650 00
Sacramento	1,110 00
San Diego	15,440 00
San Francisco	17,020 00
Santa Cruz	830 00
Solano	250 00
Total	$118,080 00
Number	11,808

FINAL STATEMENT OF HUNTING, DEER TAGS, AND TRAPPING LICENSE SALES, 1942 SERIES

County	Hunting licenses							Deer tags	Trapping licenses		
	Citizen $2 each	Junior $1 each	Non-resident $10 each	Declarant alien $10 each	Alien $25 each	Duplicate 50c each	Total Hunting	$1 each	Citizen $1 each	Alien $2 each	Total Trapping
Alameda	$20,232 00	$1,102 00	$30 00			$33 00	$30,397 00	$7,594 00			
Alpine	128 00		60 00				188 00	72 00			
Amador	1,908 00	139 00				4 00	2,051 00	790 00			
Butte	12,412 00	1,075 00	40 00			31 00	13,558 00	3,514 00			
Calaveras	1,410 00	97 00				2 50	1,509 50	662 00			
Colusa	4,250 00	410 00		$20 00	$50 00	10 50	4,740 50	1,095 00			
Contra Costa	11,022 00	467 00				12 00	11,501 00	2,952 00			
Del Norte	920 00	46 00	10 00	10 00		1 50	987 50	235 00			
El Dorado	2,728 00	183 00				3 00	2,914 00	1,222 00			
Fresno:											
Agents	17,464 00	1,315 00				5 00	18,784 00	4,141 00			
Fresno Branch	494 00	55 00	10 00	170 00	50 00	16 00	795 00	133 00	$34 00		$34 00
Totals, Fresno	$17,958 00	$1,370 00	$10 00	$170 00	$50 00	$21 00	$19,579 00	$4,274 00	$34 00		$34 00
Glenn	4,048 00	419 00				14 00	4,481 00	1,197 00			
Humboldt	9,174 00	570 00				11 50	9,755 50	3,721 00			
Imperial	4,718 00	369 00				5 50	5,092 50	28 00			
Inyo	3,528 00	267 00				16 00	3,811 00	1,456 00			
Kern	12,382 00	766 00				7 50	13,155 50	2,606 00			
Kings	3,974 00	334 00				1 00	4,309 00	756 00			
Lake	3,100 00	288 00	10 00			8 00	3,406 00	1,568 00			
Lassen	5,428 00	354 00	40 00			6 50	5,828 50	2,547 00			
Los Angeles:											
Agents	74,136 00	2,519 00	10 00			25 50	76,690 50	7,525 00			
Los Angeles Branch	352 00	38 00	60 00	230 00	225 00	29 00	934 00	94 00	49 00		49 00
Terminal Island Branch	34 00	8 00				1 50	43 50	5 00			
Totals, Los Angeles	$74,522 00	$2,565 00	$70 00	$230 00	$225 00	$56 00	$77,668 00	$7,624 00	$49 00		$49 00

Madera	2,896 00	169 00				4 50	3,069 50	900 00			
Marin	4,228 00	252 00				3 50	4,483 50	1,491 00			
Mariposa	690 00	44 00					734 00	309 00			
Mendocino	6,952 00	468 00				5 50	7,425 50	3,033 00			
Merced	7,548 00	770 00				30 00	8,348 00	1,173 00			
Modoc	4,044 00	253 00	740 00			4 50	5,041 50	2,050 00			
Mono	1,054 00	29 00	30 00			50	1,113 50	470 00			
Monterey:											
Agents	5,468 00	440 00				8 50	5,916 50	1,159 00			
Monterey Branch				30 00			30 00				
Totals, Monterey	$5,468 00	$440 00		$30 00		$8 50	$5,946 50	$1,159 00			
Napa	6,140 00	535 00				8 50	6,683 50	2,623 00			
Nevada	3,862 00	249 00	130 00	40 00		5 00	4,286 00	1,843 00			
Orange	4,738 00	412 00				2 50	5,152 50	596 00			
Placer	5,714 00	514 00	10 00			5 00	6,243 00	1,828 00			
Plumas	4,246 00	216 00	110 00		50 00	9 50	4,631 50	2,272 00			
Riverside	5,972 00	527 00				4 50	6,503 50	274 00			
Sacramento:											
Agents	23,824 00	1,590 00			25 00	8 00	25,447 00	4,737 00			
Sacramento Branch	480 00	40 00	180 00	770 00	475 00	61 50	2,006 50	128 00	202 00	8 00	210 00
Totals, Sacramento	$24,304 00	$1,630 00	$180 00	$770 00	$500 00	$69 50	$27,453 50	$4,865 00	$202 00	$8 00	$210 00
San Benito	1,488 00	157 00				7 00	1,652 00	556 00			
San Bernardino	8,352 00	586 00				12 00	8,950 00	515 00			
San Diego:											
Agents	12,808 00	750 00				1 00	13,559 00	481 00			
San Diego Branch	32 00	2 00	10 00	10 00		12 50	66 50	3 00			
Totals, San Diego	$12,840 00	$752 00	$10 00	$10 00		$13 50	$13,625 50	$484 00			
San Francisco:											
Agents	26,222 00	535 00		50 00		5 50	26,812 50	6,300 00			
San Francisco Branch	414 00	76 00	160 00	1,040 00	425 00	49 00	2,164 00	180 00	836 00	24 00	860 00
Totals, San Francisco	$26,636 00	$611 00	$160 00	$1,090 00	$425 00	$54 50	$28,976 50	$6,480 00	$836 00	$24 00	$860 00
San Joaquin	13,898 00	858 00				7 50	14,763 50	2,969 00			
San Luis Obispo	4,558 00	361 00				4 50	4,923 50	583 00			
San Mateo	5,906 00	379 00		130 00	75 00	4 50	6,494 50	1,539 00			
Santa Barbara	3,730 00	346 00				5 00	4,081 00	261 00			
Santa Clara	12,116 00	908 00		50 00		15 00	13,089 00	3,795 00			
Santa Cruz	4,220 00	369 00				9 50	4,598 50	1,324 00			
Shasta:											
Agents	8,918 00	389 00	30 00			15 50	9,352 50	3,903 00			
Redding Branch	40 00	1 00	10 00	50 00	25 00	4 00	130 00	21 00	26 00		26 00
Totals, Shasta	$8,958 00	$390 00	$40 00	$50 00	$25 00	$19 50	$9,482 50	$3,924 00	$26 00		$26 00

FINAL STATEMENT OF HUNTING, DEER TAGS, AND TRAPPING LICENSE SALES, 1942 SERIES—Continued

County	Hunting licenses							Deer tags	Trapping licenses		
	Citizen $2 each	Junior $1 each	Non-resident $10 each	Declarant alien $10 each	Alien $25 each	Duplicate 50c each	Total Hunting	$1 each	Citizen $1 each	Alien $2 each	Total Trapping
Sierra	$698 00	$46 00				$1 00	$745 00	$379 00			
Siskiyou	10,770 00	757 00	$5,510 00			19 50	17,056 50	4,824 00			
Solano	11,322 00	586 00				25 00	11,933 00	2,924 00			
Sonoma	10,834 00	924 00		$50 00		11 00	11,819 00	4,237 00			
Stanislaus	9,278 00	973 00		50 00		12 50	10,313 50	1,948 00			
Sutter	2,842 00	227 00				7 50	3,076 50	540 00			
Tehama	3,550 00	345 00				7 50	3,902 50	1,294 00			
Trinity	1,060 00	42 00				50	1,102 50	566 00			
Tulare	10,436 00	868 00				5 00	11,309 00	2,753 00			
Tuolumne	1,878 00	162 00				2 00	2,042 00	886 00			
Ventura	2,950 00	259 00				1 00	3,210 00	472 00			
Yolo	6,222 00	553 00	20 00	20 00		14 50	6,829 50	1,541 00			
Yuba	6,750 00	607 00	10 00			11 50	7,378 50	1,728 00			
Out of State:											
Arizona	92 00						92 00	6 00			
Nevada	48 00		3,350 00				3,398 00	337 00			
Oregon	1,664 00	9 00	4,420 00				6,093 00	457 00			
Totals	$473,794 00	$29,404 00	$14,990 00	$2,720 00	$1,400 00	$677 00	$522,985 00	$116,121 00	$1,147 00	$32 00	$1,179 00
Number	236,897	29,404	1,499	272	56	1,354		116,121	1,147	16	

FINAL STATEMENT OF MISCELLANEOUS LICENSE SALES BY BRANCH OFFICE AND AGENTS, 1942 SERIES

	Fresno	Los Angeles	Monterey	Redding	Sacramento	San Diego	San Francisco	Terminal Island	Agents	Total	Number
Commercial hunting club:											
Citizen, $25 each							$725 00			$725 00	29
Commercial hunting club operator:											
Citizen, $5 each							230 00			230 00	46
Alien, $25 each							50 00			50 00	2
Totals							$280 00			$280 00	
Game tags, 3 cents each	$1 98	$120 66			$24 54		76 80			223 98	7,466
Game breeder, $2.50 each	45 00	730 00			150 00		245 00			1,170 00	468
Fish packer and shellfish dealer:											
Citizen, $5 each						$75 00	700 00	$165 00		940 00	188
Fish importers, $5 each							90 00			90 00	18
Fish party boat permits, $1 each			$9 00			2 00	152 00	135 00		298 00	298
Fish breeder, $5 each							325 00			325 00	65
Fish tags, 1 cent each		40 00					3,681 00		$30 66	3,751 66	375,166
Kelp license, $10 each							60 00			60 00	6
Game management:											
License, $10 each							180 00			180 00	18
Tags, 3 cents each							5 58			5 58	186
Antelope permits, $5 each					2,500 00					2,500 00	500

FINAL STATEMENT OF HUNTING, DEER TAGS, AND TRAPPING LICENSE SALES, 1943 SERIES

County	Hunting licenses							Deer tags	Trapping licenses		
	Citizen, $2 each	Junior, $1 each	Non-resident, $10 each	Declarant alien, $10 each	Alien, $25 each	Duplicate, 50c each	Total hunting	$1 each	Citizen, $1 each	Alien, $2 each	Total, trapping
Alameda	$30,876 00	$1,039 00		$10 00		$50 50	$32,035 50	$6,688 00			
Alpine	118 00		$70 00				188 00	69 00			
Amador	2,140 00	125 00				3 00	2,268 00	1,019 00			
Butte	13,094 00	944 00	100 00			56 50	14,194 50	4,313 00			
Calaveras	1,688 00	131 00				2 00	1,821 00	857 00			
Colusa	3,948 00	337 00		20 00	$25 00	16 50	4,346 50	721 00			
Contra Costa	11,136 00	410 00		50 00		16 00	11,612 00	2,519 00			
Del Norte	782 00	35 00	90 00			1 00	908 00	227 00			
El Dorado	3,320 00	208 00	30 00			10 00	3,568 00	1,738 00			
Fresno:											
Agents	18,440 00	1,166 00				7 00	19,613 00	6,212 00			
Fresno Branch	960 00	77 00	50 00	160 00	175 00	42 00	1,464 00	327 00	$53 00		$53 00
Totals, Fresno	$19,400 00	$1,243 00	$50 00	$160 00	$175 00	$49 00	$21,077 00	$6,539 00	$53 00		$53 00
Glenn	$4,016 00	$349 00	$20 00			$18 00	$4,403 00	$954 00			
Humboldt	7,880 00	478 00				14 50	8,372 50	3,536 00			
Imperial	4,074 00	164 00				1 50	4,239 50	314 00			
Inyo	3,750 00	242 00				19 50	4,011 50	1,805 00			
Kern	13,904 00	637 00				10 50	14,551 50	3,817 00			
Kings	3,580 00	207 00				3 50	3,790 50	1,016 00			
Lake	1,868 00	142 00				5 50	2,015 50	410 00			
Lassen	5,534 00	374 00	90 00	$50 00		14 50	6,062 50	2,705 00			
Los Angeles:											
Agents	88,558 00	2,562 00	40 00			48 50	91,208 50	23,762 00			
Los Angeles Branch	692 00	43 00	130 00	170 00	$150 00	27 50	1,212 50	351 00	$54 00		$54 00
Terminal Island Branch	122 00	11 00				1 50	134 50	56 00			
Totals, Los Angeles	$89,372 00	$2,616 00	$170 00	$170 00	$150 00	$77 50	$92,555 50	$24,169 00	$54 00		$54 00

Madera	$3,330 00	$168 00				$1 50	$3,499 50	$1,185 00			
Marin	4,032 00	147 00				5 50	4,184 50	735 00			
Mariposa	798 00	39 00				50	837 50	390 00			
Mendocino	2,982 00	187 00				2 00	3,171 00	807 00			
Merced	7,096 00	591 00				27 50	7,714 50	1,451 00			
Modoc	3,890 00	280 00	$640 00			20 50	4,830 50	2,031 00			
Mono	902 00	29 00	110 00			6 50	1,047 50	482 00			
Monterey:											
Agents	7,018 00	451 00		$50 00		13 50	7,532 50	2,341 00			
Monterey Branch				20 00	$25 00		45 00				
Totals, Monterey	$7,018 00	$451 00		$70 00	$25 00	$13 50	$7,577 50	$2,341 00			
Napa	$4,776 00	$370 00		$10 00		$13 50	$5,169 50	$1,050 00			
Nevada	4,462 00	274 00	$240 00	50 00		11 50	5,037 50	2,219 00			
Orange	6,516 00	386 00				41 50	6,906 50	1,627 00			
Placer	6,572 00	486 00		20 00		12 50	7,090 50	2,704 00			
Plumas	4,698 00	256 00	80 00		$25 00	12 50	5,071 50	2,396 00			
Riverside	7,496 00	513 00				14 50	8,023 50	1,901 00			
Sacramento:											
Agents	24,026 00	1,508 00		80 00		22 00	25,636 00	6,339 00			
Sacramento Branch	1,422 00	81 00	170 00	460 00	700 00	71 50	2,904 50	329 00	$294 00	$12 00	$306 00
Totals, Sacramento	$25,448 00	$1,589 00	$170 00	$540 00	$700 00	$93 50	$28,540 50	$6,668 00	$294 00	$12 00	$306 00
San Benito	$1,732 00	$138 00				$4 00	$1,874 00	$565 00			
San Bernardino	11,352 00	655 00	$10 00			25 50	12,042 50	3,540 00			
San Diego:											
Agents	16,602 00	768 00				4 50	17,374 50	4,513 00			
San Diego Branch	148 00	13 00	10 00	$10 00		12 00	193 00	86 00			
Totals, San Diego	$16,750 00	$781 00	$10 00	$10 00		$16 50	$17,567 50	$4,599 00			
San Francisco:											
Agents	$28,798 00	$670 00		$10 00		$8 00	$29,486 00	$4,453 00			
San Francisco Branch	766 00	95 00	$120 00	990 00	$650 00	41 00	2,662 00	242 00	$1,047 00	$20 00	$1,067 00
Totals, San Francisco	$29,564 00	$765 00	$120 00	$1,000 00	$650 00	$49 00	$32,148 00	$4,695 00	$1,047 00	$20 00	$1,067 00
San Joaquin	$16,604 00	$772 00				$22 50	$17,398 50	$4,262 00			
San Luis Obispo	4,040 00	242 00				11 50	4,293 50	702 00			
San Mateo	6,142 00	368 00		$140 00	$75 00	15 00	6,740 00	1,156 00			
Santa Barbara	4,282 00	287 00	$30 00	20 00		5 00	4,624 00	1,266 00			
Santa Clara	11,992 00	795 00		80 00		11 50	12,878 50	3,057 00			
Santa Cruz	4,058 00	372 00		30 00	25 00	11 00	4,496 00	1,195 00			
Shasta:											
Agents	9,566 00	453 00	80 00	30 00		19 50	10,148 50	4,717 00			
Redding Branch	168 00	12 00	60 00	50 00	50 00	8 50	348 50	91 00	$75 00		$75 00
Totals, Shasta	$9,734 00	$465 00	$140 00	$80 00	$50 00	$28 00	$10,497 00	$4,808 00	$75 00		$75 00

FINAL STATEMENT OF HUNTING, DEER TAGS, AND TRAPPING LICENSE SALES, 1943 SERIES—Continued

County	Hunting licenses							Deer tags	Trapping licenses		
	Citizen, $2 each	Junior, $1 each	Non-resident, $10 each	Declarant alien, $10 each	Alien, $25 each	Duplicate, 50c each	Total hunting	$1 each	Citizen, $1 each	Alien, $2 each	Total, trapping
Sierra	$736 00	$55 00				$2 00	$793 00	$418 00			
Siskiyou	12,374 00	705 00	$3,730 00	$20 00		24 00	16,853 00	5,579 00			
Solano	11,064 00	553 00				29 50	11,646 50	2,182 00			
Sonoma	7,624 00	620 00		70 00		15 50	8,329 50	1,411 00			
Stanislaus	9,046 00	712 00		70 00		29 00	9,857 00	2,481 00			
Sutter	3,078 00	240 00				10 00	3,328 00	647 00			
Tehama	3,608 00	437 00				12 00	4,057 00	1,788 00			
Trinity	1,254 00	65 00				2 00	1,321 00	685 00			
Tulare	11,224 00	683 00				5 50	11,912 50	3,987 00			
Tuolumne	2,690 00	234 00	10 00	10 00		7 00	2,951 00	1,455 00			
Ventura	5,168 00	314 00				4 50	5,486 50	2,204 00			
Yolo	6,000 00	478 00	20 00	40 00		18 50	6,556 50	1,032 00			
Yuba	6,000 00	323 00				19 00	6,342 00	1,635 00			
Out of State:											
Arizona	$56 00						$56 00				
Nevada			$4,930 00				4,930 00	$513 00			
Oregon	748 00	$2 00	6,800 00			$2 50	7,552 50	530 00			
Totals	$507,416 00	$26,568 00	$17,660 00	$2,720 00	$1,900 00	$990 00	$557,254 00	$147,795 00	$1,523 00	$32 00	$1,555 00
Number	253,708	26,568	1,766	272	76	1,980		147,795	1,523	16	

FINAL STATEMENT OF MISCELLANEOUS LICENSE SALES BY BRANCH OFFICE AND AGENTS, 1943 SERIES

Type	Fresno	Los Angeles	Monterey	Redding	Sacramento	San Diego	San Francisco	Terminal Island	Agents	Total	Number
Commercial hunting club:											
Citizen, $25 each							$750 00			$750 00	30
Alien, $100 each											
Commercial hunting club operator:											
Citizen, $5 each							205 00			205 00	41
Alien, $25 each											
Fish packer and shellfish dealer:											
Citizen, $5 each						$85 00	695 00	$210 00		990 00	198
Alien, $20 each							20 00			20 00	1
Fish tags, 1 cent each		$130 00					3,665 00		$12 63	3,807 63	380,763
Game tags, 3 cents each	$1 02	87 69			$16 74		19 83			125 28	4,176
Fish importer, $5 each							85 00			85 00	17
Fish party boat permits, $1 each			$5 00				131 00	150 00		286 00	286
Fish breeder, $5 each							275 00			275 00	55
Game breeder:											
$2.50 (prior to August 4, 1943)	$100 00	$607 50			$75 00		$145 00			$927 50	371
$5.00 (from August 4, 1943)		230 00			5 00		20 00			255 00	51
Totals, game breeder	$100 00	$837 50			$80 00		$165 00			$1,182 50	422
Kelp license, $10 each							20 00			20 00	2
Game management:											
Licenses, $10 each							$160 00			$160 00	16
Tags, 3 cents each	$0 24	$3 51			$0 90		0 78			5 43	181
Antelope permits, $5 each					2,500 00					2,500 00	500
Elk permits, $10 each		750 00								750 00	75

FINAL STATEMENT OF PHEASANT TAG SALES, 1943 SERIES

County	$1.00 each	Total
Alameda		$10,671 00
Alpine		
Amador		326 00
Butte		5,669 00
Calaveras		242 00
Colusa		2,100 00
Contra Costa		4,261 00
Del Norte		20 00
El Dorado		432 00
Fresno:		
Agents		4,000 00
Fresno Branch		433 00
Total, Fresno		4,433 00
Glenn		2,152 00
Humboldt		318 00
Imperial		746 00
Inyo		849 00
Kern		1,790 00
Kings		867 00
Lake		669 00
Lassen		1,270 00
Los Angeles:		
Agents		6,782 00
Los Angeles Branch		132 00
Terminal Island Branch		14 00
Total, Los Angeles		6,928 00
Madera		769 00
Marin		1,138 00
Mariposa		116 00
Mendocino		695 00
Merced		3,016 00
Modoc		606 00
Mono		51 00
Monterey		962 00
Napa		1,903 00
Nevada		1,060 00
Orange		745 00
Placer		2,229 00
Plumas		641 00
Riverside		551 00
Sacramento:		
Agents		10,088 00
Sacramento Branch		1,116 00
Total, Sacramento		11,204 00
San Benito		265 00
San Bernardino		1,129 00
San Diego:		
Agents		665 00
San Diego Branch		8 00
Total, San Diego		673 00
San Francisco:		
Agents		8,810 00
San Francisco Branch		372 00
Total, San Francisco Branch		9,182 00
San Joaquin		5,911 00
San Luis Obispo		142 00
San Mateo		1,960 00
Santa Barbara		265 00
Santa Clara		3,515 00
Santa Cruz		975 00
Shasta:		
Agents		1,692 00
Redding Branch		95 00
Total, Shasta		1,787 00

FINAL STATEMENT OF PHEASANT TAG SALES, 1943 SERIES—Continued

County	$1.00 each	Total
Sierra		$92 00
Siskiyou		2,190 00
Solano		4,535 00
Sonoma		2,819 00
Stanislaus		4,127 00
Sutter		1,694 00
Tehama		1,439 00
Trinity		11 00
Tulare		2,242 00
Tuolumne		356 00
Ventura		356 00
Yolo		3,310 00
Yuba		2,415 00
Out of State:		
Arizona		
Nevada		150 00
Oregon		217 00
Totals		$121,186 00
Number		121,186

DEPARTMENT OF NATURAL RESOURCES, DIVISION OF FISH AND GAME,
RECORD OF FISH DISTRIBUTION
RECAPITULATION—1942

Trout

Rainbow	12,908,387
Steelhead	3,064,253
Golden	13,138
Black Spotted	419,000
Cutthroat	735
Loch Leven	3,712,350
Eastern Brook	2,907,425
Total	23,025,289

Salmon

King	3,189,790
Silver	78,907
Total	3,268,697

Spiny Rayed

Smallmouth Black Bass	36,614
Largemouth Black Bass	195
Total	36,809

GENERAL FISH RESCUE

Trout

Rainbow	5,950
Steelhead	856,114
Cutthroat	48
Total	862,112

Salmon

King	232,668
Silver	18,490
Total	251,158

Spiny Rayed

Smallmouth Black Bass	685,362
Largemouth Black Bass	1,418,269
Striped Bass	9,634
Sturgeon	2
Sacramento Perch	3,500
Crappie	88,383
Squaretail Catfish	821,208
Forkedtail Catfish	1,468,162
Bluegill Sunfish	214,672
Green Sunfish	397,330
Warmouth Bass	41,890
Shad	231
Total	5,148,643

DEPARTMENT OF NATURAL RESOURCES, DIVISION OF FISH

Hatchery	County	Total from hatchery by county	Rainbow	Steelhead
ALPINE	Alpine	607,000	112,000	
ARROWHEAD LAKE	San Bernardino	20,600	20,600	
BASIN CREEK	Alpine	80,557	40,557	
	Calaveras	316,030	174,030	
	Tuolumne	659,105	428,325	
BEAR RIVER PLANTING BASE	Nevada	865,151	382,101	
	Placer	372,253	278,738	
	Sierra	84,807	84,807	
NOAH BEERY PURCHASED FISH	Los Angeles	52,122	52,122	
	San Bernardino	34,604	34,604	
BLACK ROCK SPRINGS	Inyo	231,070	231,070	
	Mono	32,174	32,174	
	Tulare	10,000	10,000	
BROOKDALE	Alameda	7,046	7,046	
	Marin	59,349	59,349	
	Monterey	94,842	36,008	41,070
	San Benito	9,225	9,225	
	San Mateo	84,564	9,138	75,426
	Santa Clara	98,450	98,450	
	Santa Cruz	617,194	16,177	618,777
	Solano	19,360	19,360	
BURNEY CREEK	Lassen	185,000	140,000	
	Modoc	526,000	365,000	
	Shasta	754,700	455,800	
	Siskiyou	30,000		
COY FLAT	Tulare	51,230	51,230	
EXPERIMENTAL	Siskiyou	15,535	15,181	
FALL CREEK	Siskiyou	3,838,490		648,700
FEATHER RIVER	Plumas	535,000	283,300	
	Sierra	169,395	69,995	
FILLMORE	Los Angeles	73,532	73,532	
	Riverside	16,800	16,800	
	San Bernardino	193,415	193,415	
	San Diego	41,500	41,500	
	San Luis Obispo	30,200	30,200	
	Santa Barbara	15,300	15,300	
	Ventura	111,830	111,830	
FISH SLOUGH	Inyo	94,994	37,977	
	Madera	1,001		
	Mono	6,048	6,048	
FORT SEWARD	Humboldt	537,056		537,056
	Mendocino	129,650		129,650
	Trinity	34,680		34,680
HOT CREEK	Inyo	61,960	61,960	
	Madera	27,000	27,000	
	Mono	1,293,100	758,561	
HUNTINGTON LAKE	Fresno	111,525	111,525	
KAWEAH	Tulare	648,214	287,307	
KERN	Kern	49,107	23,864	
	Tulare	242,388	214,638	
KINGS RIVER	Fresno	906,668	737,030	
LAKE ALMANOR	Butte	20,000		
	Lassen	285,202	173,802	
	Plumas	726,300	500,000	
	Shasta	124,000	100,000	
	Tehama	75,000	15,000	

AND GAME, RECORD OF FISH DISTRIBUTION—1942

Golden	Black Spotted	Cutthroat	Loch Leven	Eastern Brook	King Salmon	Silver Salmon	Miscellaneous	Miscellaneous	Total
	419,000			76,000					607,000
									20,600
				40,000					
			142,000						
			139,100	91,680					1,055,692
			181,778	301,272					
			57,600	35,915					
									1,322,211
									86,726
									273,244
									990,030
			45,000						
			120,000	41,200					
			229,900	69,000					
				30,000					1,495,900
									51,230
			173	181					15,535
					3,189,790				3,838,490
			144,200	107,500					
			50,000	49,400					704,395
									482,577
2,047			54,970						
1,001									102,043
									701,386
10,090			376,429	148,020					1,382,050
									111,525
			180,482	180,425					648,214
			25,243						291,495
			27,750						
			110,265	59,373					905,668
				20,000					
			15,000	96,400					
			130,000	22,000		74,300			
				24,000					
			30,000	30,000					1,230,502

DEPARTMENT OF NATURAL RESOURCES, DIVISION OF FISH

Hatchery	County	Total from hatchery by county	Rainbow	Steelhead
MADERA	Madera	487,526	227,738	
MOUNT SHASTA	Alpine	74,000	69,000	
	Amador	148,500	116,000	
	Butte	448,000	287,000	
	El Dorado	468,500	333,000	
	Lassen	40,000	40,000	
	Modoc	16,570	15,000	
	Plumas	25,000	25,000	
	Shasta	582,720	426,720	
	Siskiyou	900,558	646,263	
	Tehama	255,000	200,000	
	Trinity	466,000	158,000	160,000
	Yuba	10,000	10,000	
MOUNT WHITNEY	Fresno	80,750	73,760	
	Inyo	571,638	185,026	
	Madera	118,080	118,080	
	Mono	282,207	108,587	
PLASKETT MEADOWS PLANTING BASE	Colusa	6,000	6,000	
	Glenn	25,000	25,000	
PRAIRIE CREEK	Del Norte	229,910		229,910
	Humboldt	553,402		548,660
	Marin	600		
	Trinity	40,320		40,320
REARING RESERVOIRS	Los Angeles	62,296	62,296	
	Orange	4,000	4,000	
	Riverside	5,120	5,120	
	San Bernardino	87,107	87,107	
	San Diego	10,452	10,452	
SEQUOIA	Fresno	59,706	59,706	
	Tulare	39,041	39,041	
TAHOE	Alpine	10,000		
	El Dorado	514,700	86,000	
	Nevada	81,280		
	Placer	291,185	66,560	
TALLAC	El Dorado	1,138,690	1,138,690	
	Nevada	150,240	150,240	
	Placer	60,000	60,000	
YOSEMITE	Mariposa	719,400	438,300	
	Tuolumne	463,000	377,400	
YUBA RIVER	Nevada	85,915		
	Sierra	363,700	209,625	
Grand totals		26,293,636	12,908,387	3,064,253

AND GAME, RECORD OF FISH DISTRIBUTION—1942—Continued

Golden	Black Spotted	Cutthroat	Loch Leven	Eastern Brook	King Salmon	Silver Salmon	Miscellaneous	Miscellaneous	Total
			144,643	115,145					487,526
				5,000					
			15,000	17,500					
			151,000	10,000					
			90,000	45,500					
			1,570						
			142,000	14,000					
			76,195	178,100					
			55,000						
				148,000					3,434,848
				16,990					
			242,992	143,620					
				173,970					1,053,025
									31,090
		135				4,607			
		609							
									824,232
									168,975
									98,747
				10,000					
			47,000	381,700					
				81,280					
			179,625	45,000					897,165
									1,348,930
			281,100						
			85,600						1,182,400
			65,925	19,990					
			74,810	79,265					449,615
13,138	419,000	735	3,712,350	2,907,426	3,189,790	78,907			26,293,986

CENTRAL VALLEYS BASS HATCHERY

Source	County	Small-mouth Black Bass	Large-mouth Black Bass	Ken-tucky Bass	Striped Bass
CENTRAL VALLEYS BASS HATCHERY	Santa Cruz		125		

SALMON AND TROUT RESCUE

Source	County	Rainbow	Steelhead
CENTRAL VALLEYS FISH RESCUE	Sacramento		
	Yolo		
NORTH COAST FISH RESCUE	Del Norte		256
	Humboldt		
	Mendocino		349,138
SOUTHERN CALIFORNIA FISH RESCUE	Riverside	3,650	
	San Bernardino	2,300	
	San Luis Obispo		16,000
	Santa Barbara		406,300
	Ventura		3,800
UPPER EEL RIVER FISH RESCUE	Lake		196,438
UPPER EEL RIVER FISH RESCUE	Sonoma		26,743
TOTAL TROUT AND SALMON RESCUE		5,950	998,675

RECAPITULATION—1942

Calico Bass	Sacramento Perch	Crappie	Squaretail Catfish	Forkedtail Catfish	Bluegill Sunfish	Mixed Sunfish	Miscellaneous	Miscellaneous	Total
			30			40			195

RECAPTULATION—1942

Golden	Black Spotted	Cutthroat	Loch Leven	Eastern Brook	King Salmon	Silver Salmon	Miscellaneous	Miscellaneous	Total
					50,600				50,600
					165,130				165,130
		48			16,938	18,034			35,276
						456			456
									349,138
									3,650
									2,300
									16,000
									406,300
									3,800
									196,438
									26,743
		48			232,668	18,490			1,255,831

DEPARTMENT OF NATURAL RESOURCES, DIVISION OF FISH AND GAME,
RECORD OF FISH DISTRIBUTION
RECAPITULATION—1943

Trout

Rainbow	13,784,642
Steelhead	1,974,801
Black Spotted	53,883
Loch Leven	1,569,530
Eastern Brook	1,722,200
Total	19,105,056

Salmon

King	3,503,320
Silver	105,325
Total	3,608,645

GENERAL FISH RESCUE

Trout

Rainbow	4
Steelhead	1,333,939
Cutthroat	48
Loch Leven	23
Total	1,334,014

Salmon

King	239,820
Silver	32,362
Total	272,182

Spiny Rayed

Smallmouth Black Bass	322,597
Largemouth Black Bass	752,999
Sacramento Perch	100,000
Crappie	32,561
Squaretail Catfish	406,155
Forkedtail Catfish	314,419
Bluegill Sunfish	134,854
Green Sunfish	29,821
Warmouth Bass	16,644
Sturgeon	3
Total	2,110,053

DEPARTMENT OF NATURAL RESOURCES, DIVISION OF FISH

Hatchery	County	Total from hatchery by county	Rainbow	Steelhead
ALPINE	Alpine	63,160	40,200	
	Amador	3,200		
	Calaveras	308,980	201,980	
	Tuolumne	708,200	565,680	
BLACK ROCK	Alpine	2,240		
	Inyo	258,854	249,615	
	Mono	37,421	12,384	
	Tulare	4,760	4,760	
BROOKDALE	Alameda	1,080	1,080	
	Marin	43,009	43,009	
	Monterey	88,436	34,188	54,248
	San Benito	9,154	9,154	
	San Mateo	82,177	9,029	73,148
	Santa Clara	134,064	134,064	
	Santa Cruz	362,040	48,717	313,323
BURNEY CREEK	Lassen	154,000	144,000	
	Modoc	339,000	258,000	
	Shasta	834,375	648,500	
	Siskiyou	30,000		
COY FLAT	Tulare	107,608	107,608	
FALL CREEK	Siskiyou	3,646,480	58,350	576,730
FEATHER RIVER	Plumas	331,850	266,100	
	Sierra	125,800	89,200	
FILLMORE	Los Angeles	203,320	203,320	
	Orange	15,650	15,650	
	Riverside	39,800	39,800	
	San Bernardino	391,600	391,600	
	San Diego	25,025	25,025	
	San Luis Obispo	5,850	5,850	
	Santa Barbara	21,600	21,600	
	Ventura	121,515	121,515	
HOT CREEK	Alpine	7,900	7,900	
	Fresno	53,800	53,800	
	Inyo	40,220	21,620	
	Madera	71,335	71,335	
	Mono	1,133,264	811,827	
KAWEAH	Tulare	182,370	10,020	
KERN	Kern	73,862	73,862	
	Tulare	214,688	214,688	
KINGS RIVER	Fresno	608,638	605,305	
LAKE ALMANOR	Lassen	174,440	174,000	
	Plumas	642,706	478,206	
	Shasta	26,000	10,000	
	Tehama	75,000	75,000	
MADERA	Fresno	5,550		
	Madera	434,161	270,106	
MOUNT SHASTA	Alpine	80,000	75,000	
	Amador	170,000	120,000	
	Butte	400,000	337,000	
	El Dorado	432,000	402,000	
	Glenn	20,000	20,000	
	Lake	5,000	5,000	
	Modoc	9,002	9,002	
	Nevada	706,000	561,000	
	Placer	453,000	309,000	
	Plumas	45,000	45,000	
	Shasta	613,764	585,764	
	Sierra	40,000	40,000	
	Siskiyou	1,060,992	851,010	
	Tehama	328,000	273,000	
	Trinity	437,390	402,200	
	Yuba	10,000	10,000	

AND GAME, RECORD OF FISH DISTRIBUTION —1943

Golden	Black Spotted	Cutthroat	Loch Leven	Eastern Brook	King Salmon	Silver Salmon	Miscellaneous	Miscellaneous	Total
				22,960					
				3,200					
			107,000						
			85,800	56,720					1,083,540
	2,240								
	9,239								
	25,037								
									303,275
									719,960
			10,000						
			40,000	41,000					
			88,525	97,350					
				30,000					1,357,375
									107,608
					3,011,400				3,646,480
				65,750					
				36,600					457,650
									824,360
			15,200	3,400					
	17,367		109,200	194,870					1,306,519
				172,350					182,370
									38,550
				3,333					308,638
				440					
				68,100		96,400			
				16,000					
									918,146
				5,550					
			87,975	76,080					439,711
				5,000					
			15,000	35,000					
			53,000	10,000					
			20,000	10,000					
			50,000	95,000					
			134,000	10,000					
			25,000	3,000					
			55,900	154,082					
			55,000						
				35,190					
									4,810,148

DEPARTMENT OF NATURAL RESOURCES, DIVISION OF FISH

Hatchery	County	Total from hatchery by county	Rainbow	Steelhead
MOUNT WHITNEY	Fresno	21,990	15,990	
	Inyo	395,189	152,559	
	Mono	310	310	
	Tulare	50,990	50,990	
PRAIRIE CREEK	Del Norte	766,840	10,000	264,920
	Humboldt	761,705	60,348	692,432
SEQUOIA	Fresno	101,899	101,899	
	Tulare	319,818	319,818	
TAHOE	El Dorado	667,910	305,020	
	Placer	239,420	196,280	
TALLAC	El Dorado	804,965	804,965	
	Nevada	32,650	32,650	
	Placer	102,150	102,150	
YOSEMITE	Mariposa	787,270	489,770	
	Tuolumne	228,940	151,140	
YUBA RIVER	Sierra	378,135	283,750	
	Yuba	18,380	18,380	
Totals		22,732,891	13,784,642	1,974,801

AND GAME, RECORD OF FISH DISTRIBUTION—1943—Continued

Golden	Black Spotted	Cutthroat	Loch Leven	Eastern Brook	King Salmon	Silver Salmon	Miscellaneous	Miscellaneous	Total
				6,000					
			242,630						
									468,479
					491,920				
						8,925			1,528,545
									421,717
				362,890					
				43,140					907,330
									939,765
			297,500						
			77,800						1,016,210
				94,385					396,515
	53,883		1,569,530	1,757,390	3,503,320	105,325			22,732,891

SPINY RAYED FISH RESCUE

Source	County	Small-mouth Black Bass	Large-mouth Black Bass	Ken-tucky Bass	Striped Bass
CENTRAL VALLEYS FISH RESCUE	Contra Costa		180		
	Fresno	3,000	14,228		
	Kern		250		
	Kings		800		
	Merced		598		
	Napa		171,500		
	Sacramento		542,249		
	San Francisco		6,608		
	San Joaqnin	168,985			
	San Mateo				
	Solano	52,792	3		
	Stanislaus		1,140		
	Sutter		13		
	Yolo	97,820	11,010		
COAST FISH RESCUE	Santa Clara				
SOUTHERN CALIFORNIA FISH RESCUE	Kern		150		
	Los Angeles		350		
	Riverside		2,485		
	San Bernardino		1,130		
	San Diego		280		
	San Luis Obispo				
	Ventura		25		
TOTAL FISH RESCUE (SPINY RAYED)		322,597	752,999		

RECAPITULATION—1943

Calico Bass	Sacramento Perch	Crappie	Square-tail Catfish	Forked-tail Catfish	Bluegill Sunfish	Green Sunfish	Warmouth Bass	Sturgeon	Total
					450				630
		9,014	11,093	55	6,151	280			43,821
		275	475						1,000
			800						1,600
		157	49	3,750	130		71		4,755
									171,500
	100,000	12,560	392,334	130,047	75,894	940	15,880	1	1,269,905
									6,608
		247	2	80,500	1,622	2,010	190		253,556
			240	150					390
									52,795
		444	61	2,367	1,730	16	413		6,171
		14		36,100		24,000			60,127
		50	1,000	61,450	950	2,500	90	2	174,872
			92		116				208
		2,500			8,000				10,650
		2,680			13,940				16,970
		1,840			9,710				14,035
		400	9		7,586				9,125
		1,940			7,000				9,220
		390			900				1,290
		50			675	75			825
	100,000	32,561	406,155	314,419	134,854	29,821	16,644	3	2,110,053

TROUT AND SALMON RESCUE

Source	County	Rainbow	Steelhead
CENTRAL VALLEYS FISH RESCUE	Placer	4	
	Sacramento		
	Sutter		
	Yolo		
NORTH COAST FISH RESCUE	Del Norte		10,063
	Humboldt		
	Lake		206,872
	Mendocino		311,700
	Santa Clara		4
SOUTHERN CALIFORNIA FISH RESCUE	Santa Barbara		778,100
	Ventura		27,200
TOTAL TROUT AND SALMON RESCUE		4	1,333,939

RECAPITULATION—1943

Golden	Black Spotted	Cutthroat	Loch Leven	Eastern Brook	King Salmon	Silver Salmon	Miscellaneous	Miscellaneous	Total
			23						27
					93,800				93,800
					70,300				70,300
					69,060				69,060
		48			6,660	23,402			40,173
						8,960			8,960
									206,872
									311,700
									4
									778,100
									27,200
		48	23		239,820	32,362			1,606,196

PREDATORY ANIMAL CATCH BY COUNTIES

	July 1, 1942 to June 30, 1943				July 1, 1943 to June 30, 1944				Total for biennium
	Coyote	Bobcat	Other predators	Total	Coyote	Bobcat	Other predators	Total	
Alpine					15			15	15
Amador	29	5	7	41	51	2	5	58	99
Calaveras	2		10	12		1		1	13
El Dorado	26	2	74	102	55	7	26	88	190
Fresno	70	2	11	83	79	5	10	94	177
Glenn	6	3	23	32	46	26	56	128	160
Inyo	65	6	6	77	116	20	28	164	241
Kern	156	38	29	223	77	14	9	100	323
Lake					1			1	1
Lassen	169	15	23	207	311	19	53	383	590
Los Angeles	95	12	31	138	125	49	37	211	349
Marin						1	1	2	2
Mariposa	17	28	35	80	43	28	72	143	223
Modoc	145	6	52	203	118	3	65	186	389
Mono	119	9	10	138					138
Monterey	87	54	137	278	137	50	98	285	563
Nevada	24	2	130	156	39	6	293	338	494
Placer	44	6	31	81					81
Plumas	9		21	30	18	1	49	68	98
Riverside	149	34	123	306	183	51	244	478	784
San Benito	162	87	171	420	210	100	155	465	885
San Bernardino	58	20	11	89	145	28	114	287	376
San Diego	370	85	360	815					815
San Luis Obispo	236	87	127	450	113	37	87	237	687
Santa Barbara	338	97	76	511	445	96	78	619	1,130
Santa Clara	13	1	27	41					41
Santa Cruz	4	6	31	41					41
Shasta	60	5	45	110	23	6	21	50	160
Siskiyou	1			1	60	17		77	78
Stanislaus	71	26	87	184	58	7	14	79	263
Tehama	9	2	10	21	13			13	34
Trinity	78	16	19	113	38	8	12	58	171
Tulare	94	19	125	238	73	10	117	200	438
Tuolumne	80	21	97	198	93	9	89	191	389
Ventura	94	20	25	139	8			8	147
Yuba	5		17	22					22
Totals	2,885	714	1,981	5,580	2,693	601	1,733	5,027	10,607

	1942-43	*1943-44*
Average number of trappers	21	22
Miles of trapline	182,147	214,285
Number of sets	253,865	264,465
Number of days	6,696	6,546

ARRESTS AND CONVICTIONS

RECAPITULATION

	Number of arrests	Fines imposed	Jail sentences (days)
Fish cases, 1942-1943	1035	$31,692 50	100
Game cases, 1942-1943	1076	41,497 50	238
Totals, 1942-1943	2111	$73,190 00	338
Fish cases, 1943-1944	1079	$28,768 00	197
Game cases, 1943-1944	1108	50,550 00	180
Totals, 1943-1944	2187	$79,318 00	377
Recapitulation:			
1942-1943	2111	$73,190 00	338
1943-1944	2187	79,318 00	377
Totals	4298	$152,508 00	715

TOTAL ARRESTS FOR A PERIOD OF FORTY-TWO YEARS

1902-1904	550
1904-1906	774
1906-1908	1,192
1908-1910	1,771
1910-1912	2,063
1912-1914	1,993
1914-1916	2,087
1916-1918	1,797
1918-1920	1,891
1920-1922	2,258
1922-1924	2,715
1924-1926	3,207
1926-1928	4,390
1928-1930	5,388
1930-1932	5,237
1932-1934	3,795
1934-1936	4,535
1936-1938	6,382
1938-1940	7,444
1940-1942	7,262
1942-1944	4,298

SEIZURES OF FISH AND GAME

Fish	July 1, 1942, to June 30, 1943	July 1, 1943, to June 30, 1944	Total
Abalones	121	234	355
Abalones, red	626	735	1,361
Abalones, green	128	23	151
Abalones, black	126	202	328
Barracuda	57		57
Bass, black	160	164	324
Bass, striped	44	25	69
Bass, pounds	6,077		6,077
Bass, striped, pounds	853	1,577	2,430
Bluegill		53	53
Bluegill, pounds	9		9
Clams		528	528
Clams, Pismo	489	108	597
Clams, Cockles	102	101	203
Clams, Horseneck	50		50
Catfish	19	23	42
Catfish, pounds	16	400	416
Crappie	76	48	124
Crappie, pounds	5		5
Fish spear	1		1
Frogs	10		10
Gill nets	2		2
Lobster, pounds	21		21
Lobster, traps	16	153	169
Lobster, receiver		1	1
Lobsters, spiney	8	72	80
Lobsters	7	23	30
Perch	1	4	5
Perch, saltwater, pounds		50	50
Salmon	95	52	147
Salmon, pounds		520	520
Salmon, net	1		1
Salmon, King		25	25
Salmon, Silver, pounds		45	45
Scallops	214		214
Shad, pounds		102	102
Sturgeon, pounds	42½		42½
Sunfish	388	175	563
Sunfish, pounds	4		4
Sunperch	25	18	43
Swordfish, Marlin, pounds		3,000	3,000
Trammel nets, pieces		11	11
Trout, Easternbrook		62	62
Trout, pounds	1¼	22	23¼
Trout, steelhead	244	69	313
Trout, steelhead, pounds		2½	2½
Trout, rainbow	277	856	1,133
Trout, rainbow, pounds		35	35
Trout, Loch Leven	7		7
Trout	820	1,028	1,848
Tuna	15,300		15,300

SEIZURE OF FISH AND GAME—Continued

Game	July 1, 1942, to June 30, 1943	July 1, 1943, to June 30, 1944	Total
Antelope	1		1
Bear meat, pounds		60	60
Deer	39	96	135
Deer meat, pounds	1,623	1,642½	3,265½
Deer meat, canned, jars	32		32
Doe	2		2
Doe meat, pounds	60		60
Doves	303	377	680
Ducks	653	754	1,407
Elk		1	1
Geese	20	69	89
Jacksnipe	1		1
Killdeer	2		2
Meadowlark	1		1
Pheasants	219	366	585
Pigeons	1	1	2
Quail	39	13	52
Rabbits, brush	28	17	45
Rabbits, jack	2		2
Rabbits, cottontail	74		74
Squirrel, tree		13	13
Squirrel, grey		2	2
Sagehens	5	2	7
Shorebirds	1		1
Sparrows		12	12
Swans	14	3	17
White crowned sparrows	5		5
Woodducks	7	3	10
Wilson snipe	2		2

FISH CASES

Offense	July 1, 1942, to June 30, 1943			July 1, 1943, to June 30, 1944		
	Arrests	Fines	Jail	Arrests	Fines	Jail
Abalones: Undersize, overlimit, out of shell, no license, closed season, remove from shell below high tide, fail to show license on demand, no commercial license	211	$5,283 00		246	$6,592 50	
Angling: No license, closed season, closed area, within 150 feet of dam, not holding rod, false statement in securing license, set lines after sundown, two poles, fish gaff 300 feet of stream, fishing in fish ladder, closed waters, lending license to another, illegally taken fish, using trout roe for bait, back dating angling license, operating set line	214	3,743 50	10	292	5,250 50	140
Barracuda: Overlimit, undersize, no license	3	30 00				
Bass: Undersize, using two rods, after sundown, night fishing, closed season, no license, two lines, overlimit, possess for sale, fail return bass to water taken in shad net, buying striped bass	115	2,558 00	16	132	2,855 00	
Bass, black: No license	32	860 00		23	635 00	
Catfish: Selling, undersize, closed season, use of net to take catfish, closed waters	4	105 00		4	135 00	
Clams: Undersize, clam forks in preserve, take clams in preserve, out of shell, overlimit, no license, closed season	90	1,832 50	29	69	1,460 00	15
Cockles: Overlimit	2	50 00				
Commercial: Operating net and taking tuna in closed season, gill net in closed waters, no license, failure give fishermen copy at delivery, operating round whole net in District 20, operating net Stanislaus River, operating purse seine net and taking bluefin tuna in closed area, failure to keep record of fresh fish purchased and from whom	68	4,340 00		36	2,770 00	
Crabs: Undersize, closed season, overlimit	3	50 00				
Crappie: Selling	16	425 00		2	70 00	
Fail show fish on demand	8	100 00	5			
Frogs: Overlimit, closed season, no license	4	125 00				
Game fish: Taken illegally	33	655 00				
Gill net: Closed area, meshes over $3/4$" in length	3	150 00				
Halibut: Closed season	2	100 00				
Lobsters: Closed season, undersize, overlimit	8	432 50		6	220 00	
No party boat permit	2	25 00				
Operating fish trap	1	50 00		2	200 00	
Perch: Closed season, no license	3	60 00		3	85 00	
Pollution	47	6,250 00	5	6	975 00	
River otter: Closed season				1	10 00	
Salmon: Undersize, taken illegally, other than angling, at night, at fish screen, no license, spearing, night spearing	38	810 00	35	79	2,735 00	30
Spearing: Spearing in prohibited area, 300 feet of stream, using gaff hook	5	125 00		4	80 00	
Steelhead: Taken illegally, overlimit, no license, possess 34 tagged steelhead, District $1\,1/2$	5	135 00				
Sturgeon: Possession	2	50 00				
Sunfish: No license, closed season, overlimit	46	950 00		15	422 50	12
Trout: Overlimit, closed area, not using hook and line, sale, more than one pole, closed area, closed season, snagging with "spanish liver," taking steelhead other than in tidewater	66	1,798 00		154	4,022 50	
Tuna: Closed area, selling, closed lake, without a commercial license	2	550 00				
Taking marine life within marine refuge	1	25 00				
Use nonnative minnows as bait				1	25 00	
Use and possess otter board trawl				4	225 00	
Wilful waste of food fish	1	25 00				
Totals	1,035	$31,692 50	100	1,079	$28,768 00	197

GAME CASES

Offense	July 1, 1942, to June 30, 1943			July 1, 1943, to June 30, 1944		
	Arrests	Fines	Jail	Arrests	Fines	Jail
Antelope: Closed season	2	$160 00				
Bear: Closed season, refuge	2	100 00		3	$100 00	
Beaver: No commercial license	1	75 00				
Coots: Shooting with 22 rifle	2	25 00				
Deer: Night hunting, refuge, take forked horn deer in District $1\frac{3}{4}$, transfer deer tags, overlimit, closed season, doe, no tags, failure to have deer tag validated, spike buck, fawn, altering deer tags, fawn, two deer in a one deer district, firearms, spotlighting, unplugged gun, early and late shooting, allowing hounds to run deer during closed season	179	9,617 00	54	301	18,780 00	95
Deer meat: Closed season, female, unstamped, no permit, illegally taken	69	5,432 00	74	76	5,090 00	
Doves: Closed season, shooting from auto, no license, overlimit, taking by trap, use license of another, unplugged gun	49	1,375 00		36	1,710 00	30
Ducks: Closed season, early and late shooting, overlimit, no license, unplugged gun, no duck stamp, failure to show game on demand, taking young from nest, shore bird possess baby ducks	273	9,046 00		182	8,077 50	55
Elk: Overlimit, cow				2	200 00	
Firearms: Refuge, shooting from highway	25	575 00		5	85 00	
Fox, grey: Closed season	1	10 00				
Game birds: Closed season, selling domesticated game birds, no license	2	50 00		5	400 00	
Geese: Overlimit, unplugged gun, refuge, no license, harrying geese with car, after sunset	8	205 00		28	852 50	
Hunting: No license, failure show license on demand, transfer of license, hunting in refuge, falsifying in order to secure citizen's license, at night, use license of another, spotlighting, refuse to show license on demand	94	1,992 00		121	3,230 00	
Jacksnipe	1	12 50				
Meadowlark	1	25 00				
Mudhens: No license	1	35 00		1	10 00	
Muskrats: Trapping for profit, no license				3	20 00	
Mountain Sheep: Kill and possess	2	200 00				
Nongame birds	15	310 00		7	200 00	
Pheasants: Closed season, hen, no license, set lines to take pheasants, failing to tag, trapping hen, no tags, shooting from auto	180	8,448 50	105	270	9,940 00	
Pigeons: Closed season	2	50 00		1	50 00	
Quail: Closed season, no license	30	650 00		18	585 00	
Rabbits: Closed season, no license	46	694 50	5	4	100 00	
Robins and flickers	1	70 00				
Sagehens: Closed season	5	325 00		4	150 00	
Seized evidence destroyed				1	10 00	
Shooting from auto	15	405 00		25	540 00	
Shorebirds	7	155 00		2	20 00	
Squirrels, tree	2	55 00		3	200 00	
Swans	2	125 00		3	60 00	
Taking birds with trap				1	25 00	
Trapping: Disturbing traps of licensed trapper, trapping for profit, no license	1	10 00		5	105 00	
Trespassing	2	75 00		1	10 00	
Waterfowl: Closed season, early and late shooting, no license, overlimit, no duck stamp	46	945 00				
Willits	1	25 00				
Wilson snipe	1	25 00				
Woodducks	8	195 00				
Totals	1,076	$41,497 50	238	1,108	$50,550 00	180

1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Totals	County
-----	1	-----	-----	-----	-----	1	-----	-----	-----	7	Alameda
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3	Alpine
-----	1	-----	-----	-----	-----	-----	-----	-----	-----	26	Amador
3	4	2	1	-----	4	1	-----	3	-----	63	Butte
4	-----	2	2	1	1	3	1	-----	-----	62	Calaveras
4	4	-----	1	-----	1	2	-----	-----	-----	75	Colusa
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Contra Costa
1	4	4	6	11	7	8	5	1	1	212	Del Norte
13	3	3	8	-----	2	6	3	6	2	211	El Dorado
4	-----	4	3	6	16	2	7	19	2	158	Fresno
5	7	8	9	11	7	5	7	6	14	212	Glenn
22	28	19	24	25	28	16	22	7	19	999	Humboldt
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	Imperial
-----	-----	-----	-----	-----	1	3	-----	-----	-----	22	Inyo
6	4	5	5	12	5	2	10	5	5	381	Kern
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1	Kings
11	13	13	12	15	10	8	12	9	7	463	Lake
2	-----	-----	-----	-----	-----	-----	-----	-----	-----	12	Lassen
3	2	3	8	5	6	5	3	2	-----	177	Los Angeles
8	3	1	2	4	3	4	12	1	-----	90	Madera
-----	-----	-----	-----	-----	-----	1	-----	-----	-----	3	Marin
3	-----	-----	-----	1	4	-----	-----	-----	-----	138	Mariposa
5	13	4	12	16	21	11	31	20	20	625	Mendocino
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	5	Merced
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	5	Modoc
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	18	Mono
2	19	8	17	11	19	14	16	10	17	532	Monterey
-----	-----	-----	-----	1	-----	-----	-----	-----	-----	4	Napa
6	1	-----	1	1	5	-----	1	-----	1	33	Nevada
-----	-----	2	-----	-----	-----	5	-----	-----	-----	18	Orange
1	5	3	-----	7	4	2	-----	-----	-----	116	Placer
3	1	-----	-----	-----	-----	1	-----	-----	-----	19	Plumas
6	8	1	2	3	-----	3	2	-----	5	101	Riverside
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1	Sacramento
2	-----	-----	-----	1	-----	-----	-----	-----	1	61	San Benito
8	2	7	4	4	15	8	6	2	1	150	San Bernardino
12	12	12	14	4	11	10	6	6	-----	236	San Diego
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	San Francisco
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	San Joaquin
-----	1	1	2	4	5	4	5	2	3	214	San Luis Obispo
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1	San Mateo
14	20	7	5	11	11	18	5	6	4	418	Santa Barbara
6	13	3	2	5	1	4	1	-----	4	108	Santa Clara
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	4	Santa Cruz
20	22	3	18	8	11	8	7	5	9	618	Shasta
2	12	1	-----	-----	-----	-----	2	3	-----	38	Sierra
7	12	20	18	18	22	12	31	13	4	495	Siskiyou
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Solano
1	-----	-----	-----	-----	-----	-----	-----	-----	1	31	Sonoma
1	-----	-----	-----	3	-----	-----	-----	-----	-----	25	Stanislaus
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	Sutter
7	9	8	6	10	9	3	4	6	17	391	Tehama
12	18	18	29	28	50	38	24	19	13	813	Trinity
4	7	9	8	15	13	17	12	8	17	423	Tulare
3	5	4	3	1	-----	1	6	-----	3	183	Tuolumne
1	1	2	1	9	-----	2	2	-----	-----	163	Ventura
-----	-----	-----	-----	-----	-----	-----	-----	-----	2	3	Yolo
3	-----	-----	1	2	-----	-----	-----	3	5	43	Yuba
215	255	177	224	253	292	228	243	162	177	9,216	Totals

CALIFORNIA FRESH FISHERY PRODUCTS FOR YEAR 1942

Compiled by Division of Fish and Game, Bureau of Marine Fisheries

Species of fish	Eureka region	Sacramento region	San Francisco region	Monterey region	Santa Barbara region
Albacore	11,616		8,286	284,684	577,893
Anchovy			5,400	149,076	75
Barracuda					256,281
Bonito					33,727
Cabezone			504	1,788	12
Cabrilla					
Carp		39,968			
Catfish		170,580			
Cultus, Pacific	200,823		42,261	68,230	484
Eel					103
Flounder	265,255		89,101	15,168	60
Flying Fish					66
Grouper					
Hake	25		2,991	38,920	
Halibut, California			6,140	12,226	275,673
Halibut, Northern	233,462				
Hardhead		92,822			
Herring, Pacific	22,042		109,022	59,730	21
Kingfish			1,617	89,305	
Mackerel, Horse				323,886	
Mackerel, Pacific			122,230	802,896	1,086,595
Mackerel, Spanish					
Mullet					
Perch	24,113		14,498	5,578	3,144
Pike		173			
Pompano, California				79	2
Rock Bass					38,980
Rockfish	269,134		70,019	655,899	83,767
Sablefish	1,625,819		29,512	290,874	2,382
Salmon	2,255,862	2,552,944	1,642,051	164,931	462
Sand Dab	162,671		112,555	67,309	7
Sardine	179	44,790,700	165,896,261	332,491,022	10,234,078
Sculpin					221
Sea-bass, Black			142	34	4,940
Sea-bass, Short-fin					
Sea-bass, White	5,714		14,440	115,138	77,485
Shad	38	2,571,595			
Shark	800,563		1,155,759	312,371	407,936
Sheepshead					35,178
Skate	12,938		54,410	19,162	11,242
Skipjack					
Smelt	37,877	164	166,927	108,048	11,327
Sole	2,066,856		589,773	378,673	100,863
Split-tail		15,391			
Sucker		95			
Swordfish, Broadbill					246,011
Tomcod	145				
Tuna, Bluefin			159		122,640
Tuna, Yellowfin					25
Turbot	3,095		3,001	21	439
Whitebait	151,022		8,227	9	
Whitefish, Ocean	94				26,751
Yellowtail					115
Miscellaneous Fish	24,349		16,743	13,677	28,295
Total fish, in pounds	8,173,697	50,234,432	170,162,029	336,468,734	13,667,280
Crustacean:					
Crab	694,486		1,638,944	80,656	
Shrimp			800,958		
Spiny Lobster					71,441
Mollusk:					
Abalone				3,675	160,787
Clam, Cockle			257		
Clam, Gaper			760		
Clam, Pismo				3,000	90,613
Clam, Soft-shell			73,144		
Clam, Washington	9,848				
Octopus	2,226		1,015	4,140	
Oyster, Eastern			92,426		
Oyster, Japanese			317,216		292,017
Oyster, Native	4,070		1,612		
Squid				875,732	
Total shellfish, in pounds	710,630		2,926,332	967,203	614,858
Grand total, in pounds	8,884,327	50,234,432	173,088,361	337,435,937	14,282,138

NOTE: All amounts shown in pounds. This record does not include albacore shipped from Oregon and Washington or fish imported from South America or the Gulf of California. This record is the catch made in or off the regions shown in the tables.

CALIFORNIA FRESH FISHERY PRODUCTS FOR YEAR 1942—Continued

Compiled by Division of Fish and Game, Bureau of Marine Fisheries

Species of fish	Los Angeles region	San Diego region	Total taken in state waters and off the coast of California	South of International Boundary brought into Los Angeles	South of International Boundary brought into San Diego	Total landings in California, including fish from west coast south of the International Boundary brought in by boat
Albacore	4,941,674	2,173,140	7,997,293	121,250	2,502,650	10,621,193
Anchovy	1,539,334	405	1,694,290			1,694,290
Barracuda	1,725,956	260,926	2,243,163	1,000,579	204,969	3,448,711
Bonito	572,706	255,408	861,841	375,267	413,581	1,650,689
Cabezone	8		2,312			2,312
Cabrilla				117,783	107,583	225,366
Carp	32,650		72,618			72,618
Catfish			170,580			170,580
Cultus, Pacific	1,157	482	313,442			313,442
Eel			103			103
Flounder	46		369,630			369,630
Flying Fish	2,740		2,806			2,806
Grouper				61,347	67,247	128,594
Hake	45		41,981			41,981
Halibut, California	216,368	64,349	574,756	86,451	94,133	755,340
Halibut, Northern			233,462			233,462
Hardhead			92,822			92,822
Herring, Pacific			190,815			190,815
Kingfish	190,929	2,294	284,145	24	56	284,225
Mackerel, Horse	4,967,835	56,780	5,348,501	140		5,348,641
Mackerel, Pacific	48,707,505	1,786,228	52,505,454		21,131	52,526,585
Mackerel, Spanish				8,364	2,817	11,181
Mullet	15,174	34,843	50,017			50,017
Perch	10,666		57,999		85	58,084
Pike			173			173
Pompano, California	3,261		3,342			3,342
Rock Bass	29,235	22,371	90,586	3,197	17,315	111,098
Rockfish	164,158	22,323	1,265,300		145,114	1,410,414
Sablefish	16,809	64	1,965,460		120	1,965,580
Salmon			6,616,250			6,616,250
Sand Dab	10,998		353,540			353,540
Sardine	411,384,755	4,949,002	969,745,997		102	969,746,099

Sculpin	42,283	1,588	44,092	7	233	44,332
Sea-bass, Black	3,746	4,675	13,537	227,050	136,809	377,396
Sea-bass, Short-fin		28	28			28
Sea-bass, White	129,297	14,424	356,498	105,890	91,207	553,595
Shad			2,571,633			2,571,633
Shark	545,609	186,605	3,408,843	384	8,266	3,417,493
Sheepshead	8,422	3,903	47,503	566	2,189	50,258
Skate	7,204	195	105,151	225		105,376
Skipjack	201,855	15,983	217,838	8,788,410	29,708,934	38,715,182
Smelt	117,490	1,389	443,222		717	443,939
Sole	8,841	21	3,145,027			3,145,027
Split-tail			15,391			15,391
Sucker			95			95
Swordfish, Broadbill	137,158	33,262	416,431		29,477	445,908
Tomcod			145			145
Tuna, Bluefin	9,460,511	748,196	10,331,506	1,916,490	596,568	12,844,564
Tuna, Yellowfin	693	597	1,315	12,298,743	28,867,383	41,167,441
Turbot	15		6,571			6,571
Whitebait			159,258			159,258
Whitefish, Ocean	4,859	375	32,079	1,390	2,517	35,986
Yellowtail	13,804	41,098	55,017	1,087,532	1,583,406	2,725,955
Miscellaneous Fish	27,137	229	110,430	2,102	377	112,909
Total fish, in pounds	485,242,933	10,681,183	1,074,630,288	26,203,191	64,604,986	1,165,438,465
Crustaceau:						
Crab	80		2,414,166			2,414,166
Shrimp			800,958			800,958
Spiny Lobster	54,592	42,608	168,641	9,424	591,556	769,621
Mollusk:						
Abalone			164,462			164,462
Clam, Cockle			257			257
Clam, Gaper			760			760
Clam, Pismo			93,613	90,979		184,592
Clam, Soft-shell			73,144			73,144
Clam, Washington			9,848			9,848
Octopus	15		7,396			7,396
Oyster, Eastern			92,426			92,426
Oyster, Japanese			609,233			609,233
Oyster, Native			5,682			5,682
Squid	30,240	33,766	939,738		4,045	943,783
Total shellfish, in pounds	84,927	76,374	5,380,324	100,403	595,601	6,076,328
Grand total, in pounds	485,327,860	10,757,557	1,080,010,612	26,303,594	65,200,587	1,171,514,793

CANNED, CURED AND MANUFACTURED FISHERY PRODUCTS OF CALIFORNIA FOR THE YEAR OF 1942

Canned

Kind of fish or fishery product	Size of cans	San Francisco district, cases	Monterey district, cases	San Pedro district, cases	San Diego district, cases	Total, cases
Albacore	1-lb.			3,199	177	3,376
	½-lb.		6,257	124,948	103,966	235,171
	¼-lb.				435	435
	¼-lb. 100's			523		523
Anchovies	¼-lb. 100's		261	242		503
Barracuda	½-lb.			4,676		4,676
Bonito	1-lb.			746	276	1,022
	½-lb.			17,369	13,897	31,266
Clams	No. 10, 6's			110		110
	½-lb.			1,944		1,944
Clam juice	No. 10, 6's			7,926		7,926
Mackerel	4-lb. 12's				443	443
	1-lb.		4,539	579,053	17,456	601,048
	½-lb.			8,815	3,220	12,035
	¼-lb. 100's			664		664
Sardine	No. 10, 6's		1,106			1,106
	4-lb., 12's				63	63
	1-lb. oval	164,452	638,343	619,881		1,422,676
	1-lb. tall	164,363	498,946	1,342,030	1,222	2,006,561
	½-lb.		8,283	1,707		9,990
	½-lb. 96's		37,255	84,069		121,324
	½-lb. filet		75,386			75,386
	5-oz. 100's	22,049	72,706	90,672		185,427
	¼-lb. sq. 100's		19,129	2,918		22,047
	3-oz. paste	2,205				2,205
Shad	1-lb.	20,058				20,058
Shad Roe	½-lb.	4,887				4,887
Squid	1-lb. tall		941			941
Tuna, Bluefin	1-lb.			8,749		8,749
	12½ oz.			179		179
	½-lb.			221,330	28,236	249,566
	¼-lb.			1,507	177	1,684
	¼-lb. 100's			18,920		18,920
Tuna, Striped	1-lb.			4,018	7,438	11,456
	½-lb.			98,427	486,671	585,098
	¼-lb.			8,539	93,315	101,854
	¼-lb. 100's			17,996	3,170	21,166
Tuna, Yellowfin	4-lb., 12's			123		123
	1-lb.			7,939	16,567	24,506
	12½ oz.			1,919		1,919
	½-lb.			192,413	498,707	691,120
	¼-lb.			3,410	29,424	32,834
	¼-lb. 100's			8,587	819	9,406
Tuna flakes	1-lb.			3,613	1,948	5,561
	½-lb.			36,267	109,148	145,415
Tuna, "tonno" style	½-lb.			383		383
	¼-lb. 100's			23,096		23,096
Yellowtail	1-lb.			2,079	208	2,287
	½-lb.			14,348	20,757	35,105
Pet food	Misc. sizes			197,403		197,403
Totals		378,014	1,363,152	3,762,737	1,437,740	6,941,643

NOTE: Forty-eight cans to the case unless otherwise specified. San Francisco District includes all area north of Monterey. San Pedro District includes Orange County.

Cured and Manufactured

Fishery product	Size or quantity	San Francisco district	Monterey district	San Pedro district	San Diego district	Total
Anchovies, salted	Pounds		5,500			5,500
Mixed fish, dried	Pounds	47,002				47,002
Mixed fish, salted	Pounds				41,248	41,248
Sablefish, kippered	Pounds	236,863				236,863
Sablefish, salted	Pounds	72,000				72,000
Salmon, smoked	Pounds	104,206				104,206
Sardine, salted	Pounds		190,920			190,920
Shrimp, dried	Pounds	2,091				2,091
Shrimp, meal	Pounds	5,120				5,120
Stickwater residuum	Tons		195			195
Fish, meal	Tons	17,748	25,170	31,633	4,452	79,003
Fish, oil	Gallons	4,183,492	5,219,441	3,146,680	137,027	12,686,640
Shark liver oil	Gallons	148,043	49,097	63,795		260,935

Miscellaneous Data

	San Francisco district	Monterey district	San Pedro district	San Diego district	Total
Estimated value of pack	$8,812,250	$12,570,434	$27,042,118	$19,007,887	$67,432,689
Number of employees	1,665	3,380	5,172	2,033	12,250
Value of plants	$3,578,273	$3,923,808	$4,418,812	$1,626,931	$13,547,824

REPORT OF SARDINE CANNING AND REDUCTION PLANTS, SEASON 1942-1943

Compiled by S. H. Dado

Prior to the opening of the season fishermen and plant operators in San Francisco and Monterey with the aid of the OPA agreed on a price of $22 per ton if the insurance was paid by the plants or $22.50 per ton if the insurance was paid by the boat owners. In Monterey fishing operations were delayed a few days after August 1st adjusting cannery workers pay and differences between the C. I. O. and A. F. L. fishermen's unions. In San Francisco the first load of sardines came in on August 8th. In Monterey the first deliveries were made on August 12th. In southern California fishing started promptly on October 1st and was exceptionally heavy for the first two weeks of the season. Landings were above average for the first three months of the season.

Hearings were held June 25th by the Commission on 76 applications for permits to use sardines by a reduction or extraction process. At the Board meeting held on July 11th 75 permits for 4,750 tons each were granted. On October 17th two more permits were granted to Associated Sardine Canners, Inc. and Del Mar Canning Company, Plant No. 2, both in Monterey. The permit was issued to Del Mar Canning Company since it was declared ready to operate but no permit was issued to the Associated Sardine Canners, Inc. as their plant was not completed and ready to operate.

On January 8, 1943, additional permits for 1,000 tons each were granted and issued to 13 canning plants in the San Pedro district and on February 11th additional permits for 1,000 tons each were granted and issued to four canning plants in Monterey. On March 5th, a permit was granted and issued to Van Camp Sea Food Co., Inc. "I. P.-A. T." Plant to use 634 tons to cover fish taken in excess of permits the plant held.

Permits were issued for the season as shown in the following table:

District	*Number of Plants*	*Tons*
San Francisco	33	156,750
Monterey	23	113,250
San Pedro	16	89,634
San Diego	4	19,000
Totals	76	378,634

A transfer of 577 tons was made from the San Francisco district to be run in a Monterey plant.

Only 54.6 per cent of the reduction permit tonnage granted was received in the San Francisco district, 68.3 per cent in the Monterey district, 70.8 per cent in the San Pedro district, and 15 per cent in the San Diego district. In the four districts combined 60.6 per cent of the tonnage granted was received leaving an unused tonnage of 149,302 tons to be canceled at the close of the season.

The permits granted on July 11th provided that not more than one-third of the tonnage granted for the season could be taken in one calendar month. In the San Francisco and Monterey districts 700 tons and in southern California 950 tons was set as the minimum amount that could be taken during any one month during the season. These rulings on maximum and minimum monthly allotments were canceled on October 16th.

During the season 208 boats engaged in fishing sardines were operated on the following basis:

Port of operations	*Number of boats*
San Francisco only	19
Monterey only	66
San Pedro only	37
San Francisco and Monterey	20
San Francisco and San Pedro	18
Monterey and San Pedro	36
San Francisco, Monterey and San Pedro	12
Total	208

Of the total boats, 197 were purse seiners and 11 were small lampara type boats using ring nets. During the season five purse seiners were lost during storms, two at San Pedro and three at Monterey.

This report does not include sardines taken for fresh fish markets, bait, quarter oil pack, or fish packed after March 31st, in square cans of less than 10 ounces in weight.

The following plants operated during the season:

SAN FRANCISCO DISTRICT

Alaska Salmon Co., Richmond
American Sardine Co., Benicia
Benicia Fisheries (2 plants), Benicia
F. E. Booth Co., Inc. (2 plants), Pittsburg
California Fish Products Co., Richmond
Carquinez Fishery, Ltd., Richmond
Cypress Fisheries, San Francisco
East Bay Fisheries, Richmond
Edible Fish Meals & Oils, Richmond
Farallone Packing Co., Div. of Borden Co. (2 plants), San Francisco
Fish-Dee-Lish Corp., Richmond
Fish Packers, McNears Point

Gardenia Packing Co., Richmond
Golden State Fisheries, Inc., Benicia
Hofmann Packing Co., McNears Point
Lansing Fisheries, San Francisco
Martinez Food Canners, Ltd., Martinez
McGovern and McGovern, Richmond
Northern Packing Corp., San Francisco
Old Capitol Packers, Inc., McNears Point
Ozol Packing Co., Martinez
Pittsburg Canners, Inc., Richmond
Point Edith Fisheries, Ltd., Richmond
Polarine Fisheries, Inc., Richmond
Red Rock Fisheries, Inc. (2 Plants), Richmond
Redondo Fish Products Co., Richmond
Richmond Fisheries, Inc., Richmond
San Pablo Fisheries, Richmond
Tamalpais Fishing and Packing Co., Richmond

MONTEREY DISTRICT

California Packing Corp., Monterey
Carmel Canning Co., Monterey
Custom House Packing Corp., Monterey
Del Mar Canning Co. (2 plants), Monterey
Edgewater Packing Co., Monterey
E. B. Gross Canning Co. (2 plants), Monterey
Hovden Food Products Corp. (2 plants), Monterey
Hovden Food Products Corp. (2 plants), Moss Landing
M. A. Leonis, Moss Landing
Lucido Fisheries, Monterey
Monterey Canning Co., Monterey
Monterey Fish Products, Inc. (2 plants), Monterey
Oxnard Canners, Inc., Monterey
Port Costa Packing Co., Moss Landing
San Carlos Canning Co., Monterey
San Xavier Fish Packing Co., Monterey
Santa Inez Fisheries, Inc., Moss Landing
Sea Pride Packing Corp., Ltd., Monterey

SAN PEDRO DISTRICT

California Marine Curing & Packing Co., Terminal Island
California Sea Food Co., Long Beach
Coast Fishing Co., Wilmington
Franco Italian Packing Co., Terminal Island
French Sardine Co. of California, Inc. (2 plants), Terminal Island [1]
K & M Fisheries, Inc., Terminal Island [2]
Sardamack Fisheries, Inc., Wilmington
Sea Pride Packing Corp., Ltd., Terminal Island

[1] Plant No. 2 burned Jan. 2, 1943.
[2] Plant burned Jan. 2, 1943.

South Coast Fisheries, Inc., Terminal Island [3]
South Pacific Canning Co., Inc., Long Beach
Southern California Fish Corp., Terminal Island
Van Camp Sea Food Co., Inc. (3 plants), Terminal Island
West Coast Packing Corp., Long Beach

SAN DIEGO DISTRICT

American Fisheries Co., San Diego [4]
High Seas Tuna Packing Co., Inc., San Diego
Sun Harbor Packing Co., San Diego
Westgate Sea Products Co., San Diego [4]

[3] Plant burned Jan. 2, 1943.
[4] Permit issued, no sardines received.

PRODUCTION OF SARDINE PLANTS

August 1, 1942, to March 31, 1943

District	Sardines received, tons	Used for canning, tons	Cannery fish overage used for meal and oil, tons	Used for meal and oil under permit, tons
San Francisco	115,586	20,657	9,344	85,585
Monterey	183,158	71,482	33,968	77,404
San Pedro	199,750	93,092	43,160	63,498
San Diego	2,847			2,847
Totals	501,341	[1]185,231	86,472	229,334
Add cannery overage used for meal and oil		86,472		
Total tons received for canning purposes		271,703		

[1] The law requires that 13½ cases of 1-lb. oval cans be canned from each ton of sardines received for canning purposes, but in calculating the amount of fish actually used in canning, a basis of 20 cases per ton is used.

District	Cannery offal, tons	1-lb. ovals packed, cases	Other size cans packed, cases	Other size cans reduced to equivalent of 1-lb. ovals, cases	Cases, per ton
San Francisco	10,327	203,287	215,560	209,878	13.8
Monterey	35,770	705,317	750,376	724,335	13.5
San Pedro	46,546	491,690	1,377,143	1,370,383	13.6
San Diego					
Totals	92,643	1,400,294	2,343,079	2,304,596	

District	Sardine meal, tons	Ratio per ton of meal	Sardine oil, gallons	Gallons of oil per ton of fish and offal
San Francisco	19,114	5.5	4,467,454	42.4
Monterey	28,255	5.2	5,590,335	38.0
San Pedro	29,015	5.3	3,049,132	19.9
San Diego	599	4.8	41,862	14.7
Totals	76,983		13,148,783	

District	Permits issued, tons	Unused permit tonnage cancelled tons	Used for other purposes, tons
San Francisco	156,750	[2]70,588	
Monterey	113,250	[2]36,423	[1]304
San Pedro	89,634	26,136	
San Diego	19,000	16,153	
Totals	378,634	149,300	[1]304

[1] 304 tons for salting.
[2] 577 tons transferred San Francisco to Monterey.

COMPARATIVE STATEMENT OF SARDINE PLANT OPERATIONS, SEASONS 1941-1942 AND 1942-1943

San Francisco District

	Season 1941-42	Season 1942-43	Increase
Tons of sardines received for canning	63,279	30,001	*33,278
Tons of sardines received under permit for meal and oil	121,381	85,585	*35,796
Tons of sardines received for pet food	1,261		*1,261
Total tons of sardines received for all purposes	185,921	115,586	*70,335
Cases of 1-lb. oval cans packed	449,589	203,287	*246,302
Cases of other size cans packed	427,566	215,560	*212,006
Other size cans reduced to equivalent cases of 1-lb. ovals	405,120	209,878	*195,242
Meal, tons	29,935	19,114	*10,821
Oil, gallons	7,162,343	4,467,454	*2,694,889

* Decrease.

Monterey District

	Season 1941-42	Season 1942-43	Increase
Tons of sardines received for canning	179,549	105,450	*74,099
Tons of sardines received under permit for meal and oil	70,139	77,404	7,265
Tons of sardines received for salting	29	304	275
Total tons of sardines received for all purposes	249,717	183,158	*66,559
Cases of 1-lb. oval cans packed	1,098,747	705,317	*393,430
Cases of other size cans packed	1,413,846	750,376	*663,470
Other size cans reduced to equivalent cases of 1-lb. ovals	1,331,057	724,335	*606,722
Meal, tons	36,309	28,255	*8,054
Oil, gallons	7,222,683	5,590,335	*1,632,348

* Decrease.

San Pedro District

	Season 1941-42	Season 1942-43	Increase
Tons of sardines received for canning	123,396	136,252	12,856
Tons of sardines received under permit for meal and oil	18,633	63,498	44,865
Tons of sardines received for pet food	4,256		*4,256
Total tons of sardines received for all purposes	146,285	199,750	53,465
Cases of 1-lb. oval cans packed	633,298	491,690	*141,608
Cases of other size cans packed	1,244,910	1,377,143	132,233
Other size cans reduced to equivalent cases of 1-lb. ovals	1,236,037	1,370,383	134,346
Meal, tons	18,590	29,015	10,425
Oil, gallons	2,088,695	3,049,132	960,437

* Decrease.

San Diego District

	Season 1941-42	Season 1942-43	Increase
Tons of sardines received for canning	68		*68
Tons of sardines received under permit for meal and oil	1,472	2,847	1,375
Total tons of sardines received for all purposes	1,540	2,847	1,307
Cases of 1-lb. oval cans packed			
Cases of other size cans packed	1,266		*1,266
Other size cans reduced to equivalent cases of 1-lb. ovals	1,266		*1,266
Meal, tons	269	599	330
Oil, gallons	25,244	41,862	16,618

* Decrease.

California, All Districts Combined

	Season 1941-42	Season 1942-43	Increase
Tons of sardines received for canning	366,292	271,703	*94,589
Tons of sardines received under permit for meal and oil	211,625	229,334	17,709
Tons of sardines received for pet food, salting, etc.	5,546	304	*5,242
Total tons of sardines received for all purposes	583,463	501,341	*82,122
Cases of 1-lb. oval cans packed	2,181,634	1,400,294	*781,340
Cases of other size cans packed	3,087,588	2,343,079	*744,509
Other size cans reduced to equivalent cases of 1-lb. ovals	2,973,480	2,304,596	*668,884
Meal, tons	85,103	76,983	*8,120
Oil, gallons	16,498,965	13,148,783	*3,350,182

* Decrease.

SARDINE CATCH BY MONTHS, SEASON 1942-43

Month	San Francisco			
	Canning	Reduction	Other purposes	Total
August, 1942	4,628	27,640		32,268
September	7,395	20,502		27,897
October	4,766	14,015		18,781
November	4,268	12,553		16,821
December	4,118	5,252		9,370
January, 1943	4,447	5,502		9,949
February	379	121		500
March				
Totals	30,001	85,585		115,586

Month	Monterey			
	Canning	Reduction	Other purposes	Total
August, 1942	14,430	16,202	41	30,673
September	28,989	19,717	167	48,873
October	7,268	4,098	2	11,368
November	13,185	12,889	44	26,118
December	16,921	10,477		27,398
January, 1943	9,636	4,532		14,168
February	14,294	9,489	50	23,833
March	727			727
Totals	105,450	77,404	304	183,158

Month	San Pedro			
	Canning	Reduction	Other purposes	Total
October, 1942	35,929	22,200		58,129
November	32,720	20,371		53,091
December	35,639	13,084		48,723
January, 1943	19,308	7,554		26,862
February	12,590	289		12,879
March 1	66			66
Totals	136,252	63,498		199,750

Month	San Diego			
	Canning	Reduction	Other purposes	Total
October, 1942		331		331
November		827		827
December		1,042		1,042
January, 1943		647		647
February				
March 1				
Totals		2,847		2,847

PACK OF 1-LB. OVALS BY MONTHS, SEASON 1942-43

Month	San Francisco, cases	Monterey, cases	San Pedro, cases	San Diego, cases	Total, cases
August, 1942	19,397	97,298			116,695
September	42,971	199,350			242,321
October	39,245	47,169	128,534		214,948
November	27,201	84,668	115,252		227,121
December	28,414	115,715	117,891		262,020
January, 1943	41,808	65,209	70,277		177,294
February	4,251	95,908	58,989		159,148
March			747		747
Totals	203,287	705,317	491,690		1,400,294

PACK OF OTHER SIZE CANS REDUCED TO EQUIVALENTS OF 1-LB. OVALS, BY MONTHS, SEASON 1942-43

Month	San Francisco, cases	Monterey, cases	San Pedro, cases	San Diego, cases	Total, cases
August, 1942	43,079	97,561			140,640
September	56,902	192,132			249,034
October	30,541	52,197	356,534		439,272
November	30,450	93,394	326,487		450,331
December	29,589	112,820	363,234		505,643
January, 1943	18,220	66,523	190,445		275,188
February	1,097	98,089	133,168		232,354
March		11,619	515		12,134
Totals	209,878	724,335	1,370,383		2,304,596

SARDINE MEAL PRODUCTION BY MONTHS, SEASON 1942-43

Month	San Francisco, tons	Monterey, tons	San Pedro, tons	San Diego, tons	Total, tons
August, 1942	5,370	4,644			10,014
September	4,598	7,355			11,953
October	3,130	1,669	8,173	60	13,032
November	2,888	4,160	7,847	152	15,047
December	1,422	4,246	7,274	261	13,203
January, 1943	1,639	2,156	4,111	126	8,032
February	67	3,937	1,602		5,606
Mach		88	8		96
Totals	19,114	28,255	29,015	599	76,983

SARDINE OIL PRODUCTION BY MONTHS, SEASON 1942-43

Month	San Francisco, gallons	Monterey, gallons	San Pedro, gallons	San Diego, gallons	Total, gallons
August, 1942	1,325,287	1,098,094			2,423,381
September	1,165,268	1,713,064			2,878,332
Octobe	768,976	354,523	1,216,837	9,362	2,349,698
Novembrer	640,630	881,961	946,778	14,548	2,483,917
December	280,465	802,864	605,502	14,218	1,703,049
January, 1943	281,511	313,276	235,902	3,734	834,423
February	5,317	422,854	43,908		472,079
March		3,699	205		3,904
Totals	4,467,454	5,590,335	3,049,132	41,862	13,148,783

CALIFORNIA FRESH FISHERY PRODUCTS FOR YEAR 1943

Compiled by Division of Fish and Game, Bureau of Marine Fisheries

Species of fish	Eureka region	Sacramento region	San Francisco region	Monterey region	Santa Barbara region
Albacore	488,361		474,332	300,549	294,675
Anchovy			78,793	198,432	
Barracuda				60	190,540
Bonito				112	367,637
Cabezone			140	7,379	13
Cabrilla					
Carp		16,735	506		
Catfish		209,485	40		
Corbina, Mexican					
Cultus, Pacific	478,755		151,410	84,802	1,857
Flounder	311,135		160,003	14,279	18,043
Flying Fish					
Grouper					
Hake	6,427		3,057	1,015	
Halibut, California			10,869	15,511	352,263
Halibut, Northern	269,991		1,070		
Hardhead		2,096			
Herring, Pacific	125,584		495,132	9,190	452
Kingfish			4,829	205,547	368
Mackerel, Horse		155,500	43	162,793	
Mackerel, Pacific		231,500	150,048	4,430,090	92,780
Mackerel, Spanish					
Mullet					
Perch	24,525		28,694	13,879	20,244
Pike		273			
Pompano, California			198	396	
Rock Bass					15,784
Rockfish	1,375,468		202,781	684,754	85,130
Sablefish	1,907,664	700	36,901	1,221,784	3,409
Salmon	2,176,182	1,295,424	2,021,123	1,101,934	
Sand Dab	280,395		143,862	75,023	
Sardine	462	73,645,540	171,029,377	439,702,334	362
Sculpin					1,680
Sea-bass, Black					1,832
Sea-bass, White	3,114		13,948	62,897	55,837
Shad		2,347,902	17	145	79
Shark	1,070,856		1,064,882	326,768	478,980
Sheepshead					96,653
Skate	16,696		34,116	16,777	4,292
Skipjack					
Smelt	66,851		965,644	292,011	10,107
Sole	3,449,278		996,257	86,134	232,647
Split-tail	72	10,925			
Swordfish, Broadbill					134,835
Tuna, Bluefin			43,182		275,899
Tuna, Yellowfin					
Turbot	6,401		13,196	705	17,745
Whitebait	137,880		3,487		
Whitefish, Ocean					22,412
Yellowtail					13
Miscellaneous Fish	49,150		26,117	2,169	19,966
Total fish, in pounds	12,245,247	77,916,080	178,154,054	449,017,469	2,796,534
Crustacean:					
Crab	229,058		2,021,556	64,724	
Shrimp			253,215	43	
Spiny Lobster					125,528
Mollusk:					
Abalone			5,891	100	631,558
Clam	728		120		
Clam, Pismo				1,759	44,111
Clam, Soft-shell			46,557		
Octopus	3,404		4,962	9,582	
Oyster, Eastern			79,878		
Oyster, Japanese			301,454		439,651
Oyster, Native			30,448		
Squid			39,060	9,065,688	
Total shellfish, in pounds	233,190		2,783,141	9,141,896	1,240,848
Grand total, in pounds	12,478,437	77,916,080	180,937,195	458,159,365	4,037,382

NOTE: All amounts shown in pounds. This record does not include albacore shipped from Oregon and Washington or fish imported from South America or the Gulf of California. This record is the catch made in or off the regions shown in the tables.

CALIFORNIA FRESH FISHERY PRODUCTS FOR YEAR 1943—Continued

Compiled by Division of Fish and Game, Bureau of Marine Fisheries

Species of fish	Los Angeles region	San Diego region	Total taken in State waters and off the coast of California	South of International Boundary brought into Los Angeles	South of International Boundary brought into San Diego	Total landings in California, including fish from west coast south of the International Boundary brought in by boat
Albacore	6,565,745	3,762,153	11,885,815	1,100,893	8,398,156	21,384,864
Anchovy	1,293,493	85	1,570,803			1,570,803
Barracuda	1,835,780	356,504	2,382,884	989,116	402,428	3,774,428
Bonito	400,842	32,944	801,535	958,270	522,079	2,281,884
Cabezone			7,532			7,532
Cabrilla				186,930	46,106	233,036
Carp			17,241			17,241
Catfish			209,525			209,525
Corbina, Mexican				5,076	30	5,106
Cultus, Pacific	1,273	1,031	719,128		190	719,318
Flounder	1,939		505,399			505,399
Flying Fish	2,271		2,271			2,271
Grouper				38,772	43,115	81,887
Hake			10,499			10,499
Halibut, California	297,096	35,155	710,894	206,004	201,846	1,118,744
Halibut, Northern			271,061			271,061
Hardhead			2,096			2,096
Herring, Pacific			630,358			630,358
Kingfish	183,534	2,219	396,497		27	396,524
Mackerel, Horse	12,379,755	883	12,698,974			12,698,974
Mackerel, Pacific	69,698,555	645,838	75,248,811	250	11,939	75,261,000
Mackerel, Spanish				6,043	12,609	18,652
Mullet		66,063	66,063		7,218	73,281
Perch	25,408		112,750	213		112,963
Pike			273			273
Pompano, California	4,549	25	5,168			5,168
Rock Bass	106,919	21,500	144,203	12,177	25,067	181,447
Rockfish	196,374	11,395	2,555,902	26,255	177,473	2,759,630
Sablefish	34,147		3,204,605		1,469	3,206,074
Salmon			6,594,663			6,594,663
Sand Dab	6,058		505,338			505,338
Sardine	282,710,040	5,160,375	972,248,490		525	972,249,015
Sculpin	29,372	4,931	35,983		6,567	42,550

Sea-bass, Black	7,280	10,159	19,271	430,512	250,419	700,202
Sea-bass, White	215,244	28,138	379,178	69,408	51,512	500,098
Shad			2,348,143			2,348,143
Shark	571,687	203,627	3,716,800	2,891	3,038	3,722,729
Sheepshead	25,608	2,437	124,698	2,027	20,822	147,547
Skate	9,028		80,909	200		81,109
Skipjack	15,573	2,331	17,904	6,991,375	21,884,505	28,893,784
Smelt	226,168	303	1,561,084	151	776	1,562,011
Sole	17,856	5	4,782,177	167	35	4,782,379
Split-tail			10,997			10,997
Swordfish, Broadbill	174,562	8,231	317,628		18,758	336,386
Tuna, Bluefin	6,763,490	581,316	7,663,887	2,217,911	296,372	10,178,170
Tuna, Yellowfin	385	1,673	2,058	19,058,888	30,200,382	49,261,328
Turbot			38,047			38,047
Whitebait			141,367			141,367
Whitefish, Ocean	17,862	1,741	42,015	4,901	49,096	96,012
Yellowtail	17,043	16,303	33,359	4,018,596	882,924	4,934,879
Miscellaneous Fish	61,072	2	158,476	1,177	924	160,577
Total fish, in pounds	383,896,008	10,957,367	1,114,982,759	36,328,203	63,516,407	1,214,827,369
Crustacean:						
Crab			2,315,338			2,315,338
Shrimp			253,258			253,258
Spiny Lobster	120,481	52,368	298,377	178,902	508,246	985,525
Mollusk:						
Abalone	42,725		680,274			680,274
Clam			848			848
Clam, Pismo			45,870	356,849	208,915	611,634
Clam, Soft-shell			46,557			46,557
Octopus	72		18,020			18,020
Oyster, Eastern			79,878			79,878
Oyster, Japanese			741,105			741,105
Oyster, Native			30,448			30,448
Squid	27,213	32,400	9,164,361			9,164,361
Total shellfish, in pounds	190,491	84,768	13,674,334	535,751	717,163	14,927,248
Grand total, in pounds	384,086,499	11,042,135	1,128,657,093	36,863,954	64,233,568	1,229,754,615

CANNED, CURED AND MANUFACTURED FISHERY PRODUCTS OF CALIFORNIA FOR THE YEAR 1943

Canned

Kind of fish or fishery product	Size of cans	San Francisco district, cases	Monterey district, cases	San Pedro district, cases	San Diego district, cases	Total, cases
Albacore	1-lb.			2,280	17,435	19,715
	½-lb.		11,342	184,772	209,906	406,020
	¼-lb.				6	6
Anchovy	¼-lb., sq. 100's		87			87
Barracuda	½-lb.			389		389
Bonito	1-lb.			352		352
	½-lb.			28,463	6,457	34,920
	¼-lb.				353	353
Clams	½-lb.			10,225		10,225
Clam juice	No. 10, 6's			906		906
Mackerel	1-lb.	20	7,997	827,040	4,255	839,312
Sardine	No. 10, 6's	32,523				32,523
	1-lb. ovals	270,005	775,446	400,504		1,445,955
	1 lb. tall	89,966	742,968	846,314	697	1,679,945
	10½ oz., E. O.	3,514				3,514
	½-lb. sq.	2,934	25,526			28,460
	½-lb. 96's	1,506	53,537	44,516		99,559
	½-lb. filet		44,935			44,935
	5-oz. 100's	10,104	10,176	26,507		46,787
	¼-lb. sq. 100's		16,193	2,235		18,428
Salmon	¼-lb. 100's	1,475				1,475
Shad	1-lb.	11,516				11,516
Shad Roe	½-lb. oval	6,252				6,252
Skipjack	1-lb.			1,981	3,856	5,837
	½-lb.			84,592	285,236	369,828
	¼-lb.			403	5,872	6,275
	¼-lb. 100's			1,227		1,227
Squid	1-lb.		112,175	80		112,255
	½-lb.		6,982			6,982
Tuna, Bluefin	1-lb.			2,159	162	2,321
	½-lb.			160,685	11,859	172,544
Tuna, Yellowfin	1-lb.			23,952	41,505	65,457
	½-lb.			268,513	350,609	619,122
	¼-lb.			11,416		11,416
	¼-lb. 100's			214		214
Tuna flakes	1-lb.			4,624	179	4,803
	½-lb.			115,924	381,788	497,712
Tuna, "tonno" style	½-lb.			1,041		1,041
	¼-lb. 100's			16,198		16,198
Yellowtail	1-lb.			4,530		4,530
	½-lb.			63,250	5,488	68,738
Totals		429,815	1,807,364	3,135,292	1,325,663	6,698,134

NOTE: Forty-eight cans to the case unless otherwise specified. San Francisco District includes all area north of Monterey. San Pedro District includes Orange County.

Cured and Manufactured

Fishery product	Size or quantity	San Francisco district	Monterey district	San Pedro district	San Diego district	Total
Anchovy, salted	Pounds		4,000			4,000
Mackerel, salted	Pounds		34,000			34,000
Mixed fish, dried	Pounds	64,037				64,037
Mixed fish, smoked	Pounds	12,553				12,553
Sablefish, kippered	Pounds	230,241				230,241
Salmon, mild cure	Tierces	226				226
Salmon, smoked	Pounds	86,650				86,650
Sardine, salted	Pounds		135,350			135,350
Shad, mild cure	Pounds	92,800				92,800
Shrimp, dried	Pounds	2,075				2,075
Shrimp, meal	Pounds	4,500				4,500
Fish, meal[1]	Tons	19,682	37,416	24,753	4,300	86,151
Fish, oil	Gallons	4,979,798	6,652,715	2,262,889	120,777	14,016,179
Liver oil	Gallons	188,826	90,939	77,509		357,274

[1] Includes 4,160 tons of residuum from stickwater.

Miscellaneous Data

	San Francisco district	Monterey district	San Pedro district	San Diego district	Total
Estimated value of pack	$10,608,935	$17,048,271	$27,180,215	$15,658,679	$70,496,100
Number of employees	1,906	3,308	5,158	1,771	12,143
Value of plants	$3,933,244	$4,368,836	$5,324,824	$2,416,886	$16,043,790

REPORT OF SARDINE CANNING AND REDUCTION PLANTS, SEASON 1943-1944

Compiled by S. H. Dado

Price for sardines was set by the O. P. A., prior to the opening of the season, at $22 per ton plus insurance.

Fish were delivered in the San Francisco District on August 5 and in the Monterey District on August 2. In southern California deliveries started on the opening day of the season, October 1. Hearings on 82 applications for permits to use sardines by a reduction process were held on June 2 in Los Angeles, and permits were granted to 82 applicants to be issued when the plant was equipped and ready to operate. Prior to the opening of the season, 74 permits for 4,750 tons each were issued; and one additional plant in the San Francisco District qualified and was issued a permit in October for 3,270 tons, a deduction from the basic tonnage being made as the plant was not ready to operate on opening of the season. On December 15 an additional grant of 1,000 tons was made to such plants as could show need for such additional tonnage to continue operations. Thirteen plants in the Monterey District, and three plants in the San Pedro District were issued additional permits for 1,000 tons each.

Permits were issued for the season, as shown in the following table:

District	*No. of plants*	*Tons issued*	*Tons used*	*Tons unused*
San Francisco	34	160,020	95,332	64,688
Monterey	22	117,002	96,826	20,176
San Pedro	16	79,000	46,912	32,088
San Diego	3	14,250	2,663	11,587
Totals	75	370,272	241,733	128,539

In the Monterey district 498 tons of permit tonnage was revoked, and has been deducted in the above table.

Of the permit tonnage issued, only 59.6% was used in the San Francisco District, 82.7% in the Monterey District, 59.4% in the San Pedro District, and 18.7% in the San Diego District. For the entire State, 65.3% of the permit tonnage issued was used.

The permits were issued without any limitation on the amount of fish that could be received monthly.

During the season there were 206 boats engaged in fishing sardines, of which 197 were purse seine boats, and 9 were lampara type boats, using ring nets. These boats were operated during the season, as follows:

Port of operation	*No. of boats*
San Francisco, exclusively	10
Monterey, exclusively	59
San Pedro, exclusively	41
San Francisco and Monterey	37
San Francisco and San Pedro	38
Monterey and San Pedro	15
San Francisco, Monterey, and San Pedro	6
Total	206

This report does not include sardines taken for fresh fish markets, bait or fish packed after March 31st, in square cans of less than 10 ounces in weight.

The following plants operated during the season:

SAN FRANCISCO DISTRICT

Alaska Salmon Co., Richmond
American Sardine Co., Benicia
Benicia Fisheries (2 plants), Pittsburg
F. E. Booth Co., Inc. (2 plants), Pittsburg
California Fish Products Co., Richmond
Carquinez Fishery, Ltd., Richmond
Cypress Fisheries, San Francisco
East Bay Fisheries, Richmond
Edible Fish Meals & Oils, Richmond
Farallone Packing Co., Div. of Borden Co. (2 plants), San Francisco
Fish-Dee-Lish Corp., Richmond
Fish Packers, McNears Point
Gardenia Packing Co., Richmond
Golden State Fisheries, Benicia
Hofmann Packing Co., McNears Point
Lansing Fisheries, San Francisco
Martinez Food Canners, Ltd., Martinez
McLaughlin, Harold, Richmond
Monitor Fisheries, Richmond
Northern Packing Corp., San Francisco
Old Capitol Packers, McNears Point
Ozol Packing Co., Martinez
Pittsburg Canners, Inc., Richmond
Point Edith Fisheries, Ltd., Richmond
Polarine Fisheries, Inc., Richmond
Red Rock Fisheries, Inc. (2 plants), Richmond
Redondo Fish Products Co., Richmond
Richmond Fisheries, Inc., Richmond
San Pablo Fisheries, Richmond
Tamalpais Fishing and Packing Co., Richmond

MONTEREY DISTRICT

California Packing Corp., Monterey
Carmel Canning Co., Monterey
Custom House Packing Corp., Monterey
Del Mar Canning Co., Monterey
Edgewater Packing Co., Monterey
Hovden Food Products Corp. (2 plants), Monterey
Hovden Food Products Corp., Moss Landing
Lone Wolf Packing Co., Moss Landing
Lucido Fisheries, Monterey
Monterey Canning Co., Monterey
Monterey Fish Products, Inc. (2 plants), Monterey
Oxnard Canners, Inc., Monterey
Peninsula Packing Co. (2 plants), Monterey
Port Costa Packing Co., Moss Landing
San Carlos Canning Co., Monterey
San Xavier Fish Packing Co., Monterey
Santa Inez Fisheries, Inc., Moss Landing
Sea Pride Packing Co., Monterey
Western Fish Products Co., Moss Landing

SAN PEDRO DISTRICT

California Marine Curing & Packing Co., Terminal Island
California Sea Food Co., Long Beach
Coast Fishing Co., Wilmington
Franco Italian Packing Co., Terminal Island
French Sardine Co. of California, Inc. (2 plants), Terminal Island
Golden State Sea Food Co., Long Beach
K & M Fisheries, Inc., Terminal Island
Sardamack Fisheries, Wilmington
South Coast Fisheries, Inc., Terminal Island
South Pacific Canning Co., Inc., Long Beach
Southern California Fish Corp., Terminal Island
Terminal Island Sea Foods, Ltd., Terminal Island
Van Camp Sea Food Co., Inc. (3 plants), Terminal Island
West Coast Packing Corp., Long Beach
West Coast Packing Corp., Newport Beach

SAN DIEGO DISTRICT

High Seas Tuna Packing Co., Inc., San Diego
Sun Harbor Packing Co., San Diego
Westgate Sea Products Co., San Diego

PRODUCTION OF SARDINE PLANTS

August 1, 1943, to March 31, 1944

District	Sardines received, tons	Used for canning, tons	Cannery fish overage used for meal and oil, tons	Used for meal and oil under permit, tons
San Francisco	126,132	21,269	9,531	95,332
Monterey	212,383	78,147	37,148	96,826
San Pedro	132,317	58,047	27,358	46,912
San Diego	2,690	27		2,663
Totals	473,522	[1]157,490	74,037	241,733
Add cannery overage used for meal and oil		74,037		
Total tons received for canning purposes		231,527		

[1] The law requires that 13½ cases of 1-lb. oval cans be canned from each ton of sardines received for canning purposes, but in calaculating the amount of fish actually used in canning, a basis of 20 cases per ton is used.

District	Cannery offal, tons	1-lb. ovals packed, cases	Other size cans packed, cases	Other size cans reduced to equivalent of 1-lb. ovals, cases	Cases, per ton
San Francisco	10,631	277,724	153,866	147,763	13.8
Monterey	39,076	747,978	821,082	815,058	13.5
San Pedro	29,019	377,420	781,934	783,633	13.6
San Diego	14		697	697	25.8
Totals	78,740	1,403,122	1,757,579	1,747,151	

District	Sardine meal, tons	Ratio of wet material per ton of meal	Sardine oil, gallons	Gallons of oil per ton of fish and offal
San Francisco	20,064	5.7	5,018,816	43.5
Monterey	32,840	5.2	6,578,416	38.0
San Pedro	20,081	5.1	2,135,162	20.7
San Diego	527	5.1	50,617	18.9
Totals	73,512		13,783,011	

District	Permits issued, tons	Unused permit tonnage cancelled, tons	Used for other purposes, tons
San Francisco	160,020	64,688	
Monterey	117,002	20,176	[1]262
San Pedro	79,000	32,088	
San Diego	14,250	11,587	
Totals	370,272	128,539	[1]262

[1] 262 tons for salting.

COMPARATIVE STATEMENT OF SARDINE PLANT OPERATIONS, SEASONS 1942-43 AND 1943-44

San Francisco District

	Season 1942-43	Season 1943-44	Increase
Tons of sardines received for canning	30,001	30,800	799
Tons of sardines received under permit for meal and oil	85,585	95,332	9,747
Tons of sardines for salting			
Total tons of sardines received for all purposes	115,586	126,132	10,546
Cases of 1-lb. oval cans packed	203,287	277,724	74,437
Cases of other size cans packed	215,560	153,866	*61,694
Other size cans reduced to equivalent of 1-lb. ovals	209,878	147,763	*62,115
Meal, tons	19,114	20,064	950
Oil, gallons	4,467,454	5,018,816	551,362

* Decrease.

Monterey District

	Season 1942-43	Season 1943-44	Increase
Tons of sardines received for canning	105,450	115,295	9,845
Tons of sardines received under permit for meal and oil	77,404	96,826	19,422
Tons of sardines received for salting	304	262	*42
Total tons of sardines received for all purposes	183,158	212,383	29,225
Cases of 1-lb. ovals packed	705,317	747,978	42,661
Cases of other size cans packed	750,376	821,082	70,706
Other size cans reduced to equivalent of 1-lb. ovals	724,335	815,058	90,723
Meal, tons	28,255	32,840	4,585
Oil, gallons	5,590,335	6,578,416	988,081

* Decrease.

San Pedro District

	Season 1942-43	Season 1943-44	Increase
Tons of sardines received for canning	136,252	85,405	*50,847
Tons of sardines received under permit for meal and oil	63,498	46,912	*16,586
Totals	199,750	132,317	*67,433
Cases of 1-lb. oval cans packed	491,690	377,420	*114,270
Cases of other size cans packed	1,377,143	781,934	*595,209
Other size cans reduced to equivalent cases of 1-lb. ovals	1,370,383	783,633	*586,750
Meal, tons	29,015	20,081	*8,934
Oil, gallons	3,049,132	2,135,162	*913,970

* Decrease.

San Diego District

	Season 1942-43	Season 1943-44	Increase
Tons of sardines received for canning		27	27
Tons of sardines received under permit for meal and oil	2,847	2,663	*184
Total tons of sardines received for all purposes	2,847	2,690	*157
Cases of 1-lb. oval cans packed			
Cases of other size cans packed		697	697
Other size cans reduced to equivalent cases of 1-lb. ovals		697	697
Meal, tons	599	527	*72
Oil, gallons	41,862	50,617	8,755

* Decrease.

California, All Districts Combined

	Season 1942-43	Season 1943-44	Increase
Tons of sardines received for canning	271,703	231,527	*40,176
Tons of sardines received under permit for meal and oil	229,334	241,733	12,399
Tons of sardines received for salting	304	262	*42
Total tons of sardines received for all purposes	501,341	473,522	*27,819
Cases of 1-lb. oval cans packed	1,400,294	1,403,122	2,828
Cases of other size cans packed	2,343,079	1,757,579	*585,500
Other size cans reduced to equivalent cases of 1-lb. ovals	2,304,596	1,747,151	*557,445
Meal, tons	76,983	73,512	*3,471
Oil, gallons	13,148,783	13,783,011	634,228

* Decrease.

SARDINE CATCH BY MONTHS, SEASON 1943-44

Month	San Francisco			
	Canning	Reduction	Other purposes	Total
August, 1943	4,515	16,432		20,947
September	10,813	62,644		73,457
October	2,956	2,445		5,401
November	4,710	4,834		9,544
December	1,674	389		2,063
January, 1944	5,968	8,333		14,301
February	164	255		419
Totals	30,800	95,332		126,132

Month	Monterey			
	Canning	Reduction	Other purposes	Total
August, 1943	19,040	7,609		26,649
September	22,810	23,092		45,902
October	14,171	9,683	25	23,879
November	18,643	21,772	50	40,465
December	20,873	22,015	74	42,962
January, 1944	13,733	10,821	64	24,618
February	5,989	1,834	49	7,872
March	36			36
Totals	115,295	96,826	262	212,383

Month	San Pedro			
	Canning	Reduction	Other purposes	Total
October, 1943	31,430	17,754		49,184
November	14,055	6,104		20,159
December	17,921	11,623		29,544
January, 1944	16,410	9,971		26,381
February and March 1	5,589	1,460		7,049
Totals	85,405	46,912		132,317

Month	San Diego			
	Canning	Reduction	Other purposes	Total
October, 1943		631		631
November	14	831		845
December	13	424		437
January, 1944		768		768
February		9		9
Totals	27	2,663		2,690

PACK OF 1-LB. OVALS BY MONTHS, SEASON 1943-44

Month	San Francisco, cases	Monterey, cases	San Pedro, cases	San Diego, cases	Total, cases
August, 1943	40,708	124,945			165,653
September	97,418	144,589			242,007
October	31,247	83,509	119,903		234,659
November	40,348	121,154	69,505		231,007
December	12,143	140,160	81,084		233,387
January, 1944	55,472	91,911	75,053		222,436
February	388	41,710	31,875		73,973
March					
Totals	277,724	747,978	377,420		1,403,122

PACK OF OTHER SIZE CANS REDUCED TO EQUIVALENTS OF 1-LB. OVALS, BY MONTHS, SEASON 1943-44

Month	San Francisco, cases	Monterey, cases	San Pedro, cases	San Diego, cases	Total, cases
August, 1943	20,252	135,729			155,981
September	48,601	163,436			212,037
October	9,518	107,867	310,141		427,526
November	23,720	130,652	121,478	357	276,207
December	10,969	142,123	161,092	340	314,524
January, 1944	32,281	93,761	146,881		272,923
February	2,422	40,995	44,041		87,458
March		495			495
Totals	147,763	815,058	783,633	697	1,747,151

SARDINE MEAL PRODUCTION BY MONTHS, SEASON 1943-44

Month	San Francisco, tons	Monterey, tons	San Pedro, tons	San Diego, tons	Total, tons
August, 1943	3,239	3,558			6,797
September	12,015	6,940			18,955
October	789	3,668	7,219	117	11,793
November	1,297	6,491	3,147	154	11,089
December	309	7,002	4,586	97	11,994
January, 1944	2,344	3,921	4,150	157	10,572
February	71	1,255	979	2	2,307
March		5			5
Totals	20,064	32,840	20,081	527	73,512

SARDINE OIL PRODUCTION BY MONTHS, SEASON 1943-44

Month	San Francisco, gallons	Monterey, gallons	San Pedro, gallons	San Diego, gallons	Total, gallons
August, 1943	811,233	779,287			1,590,520
September	3,247,398	1,715,873			4,963,271
October	224,920	749,362	1,075,203	16,397	2,065,882
November	353,538	1,411,859	373,732	19,638	2,158,767
December	50,100	1,254,368	436,781	6,603	1,747,852
January, 1944	322,338	539,941	212,325	7,939	1,082,543
February	9,289	127,681	37,121	40	174,131
March		45			45
Totals	5,018,816	6,578,416	2,135,162	50,617	13,783,011

SARDINE CATCH, CASE PACK, MEAL AND OIL PRODUCTION

For Sardine Packing Seasons

Sardine Catch, Tons

Season	San Francisco district	Monterey district	San Pedro district	San Diego district	Total
1925-26	248	69,011	61,992	5,214	136,465
1926-27	2,653	76,690	64,216	----------	143,559
1927-28	11,066	98,678	67,459	3,973	181,176
1928-29	12,757	119,102	119,180	1,394	252,433
1929-30	20,655	159,434	140,432	2,079	322,600
1930-31	24,468	108,953	38,580	----------	172,001
1931-32	19,938	68,825	42,557	----------	131,320
1932-33	17,417	89,257	83,492	----------	190,166
1933-34	35,467	151,937	124,950	1,488	313,842
1934-35	67,140	229,992	178,755	4,859	480,746
1935-36	74,231	184,113	138,333	10,489	407,166
1936-37	139,429	206,229	137,914	4,569	488,141
1937-38	132,248	104,464	109,015	107	345,834
1938-39	200,361	180,090	145,335	2,790	528,576
1939-40	211,471	227,231	93,081	95	531,878
1940-41	117,817	165,145	170,559	1,188	454,709
1941-42	185,921	249,717	146,285	1,540	583,463
1942-43	115,586	183,158	199,750	2,847	501,341
1943-44	126,132	212,383	132,317	2,690	473,522

Sardines, 1-Lb. Ovals, Cases

Season	San Francisco district	Monterey district	San Pedro district	San Diego district	Total
1925-26	3,892	937,014	968,495	66,074	1,975,475
1926-27	51,657	1,150,859	986,858	----------	2,189,374
1927-28	110,911	1,363,251	878,175	39,380	2,391,717
1928-29	114,446	1,405,746	1,140,488	12,383	2,673,063
1929-30	206,478	1,797,566	1,493,615	16,551	3,514,210
1930-31	266,598	1,069,627	403,041	----------	1,739,266
1931-32	269,586	720,518	470,796	----------	1,460,900
1932-33	157,469	253,000	321,794	----------	732,263
1933-34	221,798	748,706	526,540	----------	1,497,044
1934-35	264,805	629,779	591,759	----------	1,486,343
1935-36	336,554	919,497	680,103	----------	1,936,154
1936-37	198,621	818,909	629,802	----------	1,647,332
1937-38	127,214	502,194	553,306	----------	1,182,714
1938-39	172,454	687,287	630,998	----------	1,490,739
1939-40	196,011	1,092,981	545,182	----------	1,834,174
1940-41	168,700	622,219	672,780	----------	1,463,699
1941-42	449,589	1,098,747	633,298	----------	2,181,634
1942-43	203,287	705,317	491,690	----------	1,400,294
1943-44	277,724	747,978	377,420	----------	1,403,122

Other Size Cans Reduced to Equivalents of 1-Lb. Ovals, Cases

Season	San Francisco district	Monterey district	San Pedro district	San Diego district	Total
1925-26	----------	35,956	16,361	13,065	65,382
1926-27	----------	21,673	63,264	----------	84,937
1927-28	40,825	14,160	145,143	31,995	232,123
1928-29	69,886	45,778	173,540	10,368	299,572
1929-30	79,224	90,238	458,416	12,552	640,430
1930-31	69,932	176,384	170,388	----------	416,704
1931-32	8,381	43,816	159,066	----------	211,263
1932-33	5,129	10,815	75,775	----------	91,719
1933-34	9,846	113,842	331,631	5,396	460,715
1934-35	12,025	142,535	222,661	13,058	390,279
1935-36	39,597	594,191	627,117	19,856	1,280,761
1936-37	42,986	469,296	819,859	9,573	1,341,714
1937-38	33,763	326,543	756,369	1,040	1,117,715
1938-39	51,658	376,076	655,303	----------	1,083,037
1939-40	90,628	670,420	539,666	80	1,300,794
1940-41	119,713	597,627	934,975	452	1,652,767
1941-42	405,120	1,331,057	1,236,037	1,266	2,973,480
1942-43	209,878	724,335	1,370,383	----------	2,304,596
1943-44	147,763	815,058	783,633	697	1,747,151

Sardine Meal, Tons

Season	San Francisco district	Monterey district	San Pedro district	San Diego district	Total
1925-26	20	6,393	5,962	467	12,842
1926-27	228	6,447	5,962	----------	12,637
1927-28	1,183	9,355	7,128	184	17,850
1928-29	1,387	12,395	14,802	140	28,724
1929-30	2,282	16,671	16,258	251	35,462
1930-31	2,716	11,490	4,317	----------	18,523
1931-32	2,303	7,825	4,911	----------	15,039
1932-33	2,297	14,370	14,060	----------	30,727
1933-34	5,073	22,206	19,166	262	46,707
1934-35	10,571	36,396	29,836	848	77,651
1935-36	11,604	26,933	19,422	1,945	59,904
1936-37	23,686	31,867	18,735	827	75,115
1937-38	23,058	15,383	14,525	15	52,981
1938-39	34,751	28,859	22,066	537	86,213
1939-40	36,324	34,568	12,145	16	83,053
1940-41	20,541	25,805	24,560	216	71,122
1941-42	29,935	36,309	18,590	269	85,103
1942-43	19,114	28,255	29,015	599	76,983
1943-44	20,064	32,840	20,081	527	73,512

Sardine Oil, Gallons

Season	San Francisco district	Monterey district	San Pedro district	San Diego district	Total
1925-26	2,629	1,110,983	658,817	43,995	1,816,424
1926-27	60,967	1,501,384	682,796	----------	2,245,147
1927-28	257,989	1,601,993	711,579	10,253	2,581,814
1928-29	288,055	2,651,524	2,178,815	6,857	5,125,251
1929-30	474,530	3,887,472	1,986,704	11,071	6,359,777
1930-31	763,643	3,363,912	630,011	----------	4,757,566
1931-32	612,181	2,143,101	762,701	----------	3,517,983
1932-33	574,958	3,761,387	2,161,476	----------	6,497,821
1933-34	1,175,401	4,819,900	3,242,899	24,303	9,262,503
1934-35	2,514,588	9,379,239	4,865,486	111,252	16,870,565
1935-36	3,196,286	6,854,372	2,939,863	210,171	13,200,692
1936-37	5,509,905	6,814,184	1,898,134	77,700	14,299,923
1937-38	4,659,147	3,067,587	1,447,631	912	9,175,277
1938-39	7,804,909	5,462,066	2,197,757	37,325	15,502,057
1939-40	9,313,706	7,090,963	984,851	472	17,389,992
1940-41	4,809,853	5,197,570	2,369,300	21,587	12,398,310
1941-42	7,162,343	7,222,683	2,088,695	25,244	16,498,965
1942-43	4,467,454	5,590,335	3,049,132	41,862	13,148,783
1943-44	5,018,816	6,578,416	2,135,162	50,617	13,783,011

Sardine Oil Production, Gallons per Ton

Season	San Francisco district	Monterey district	San Pedro district	San Diego district
1930-31	47.5	43.2	26.3	----------
1931-32	47.1	43.1	28.5	----------
1932-33	43.0	45.6	29.1	----------
1933-34	39.6	37.0	31.3	17.7
1934-35	41.7	44.5	30.7	24.7
1935-36	49.9	46.8	27.9	21.0
1936-37	41.3	39.1	18.9	17.9
1937-38	36.3	36.6	19.3	11.1
1938-39	40.2	35.6	19.8	13.4
1939-40	45.5	38.7	15.5	5.0
1940-41	43.8	38.6	18.7	18.3
1941-42	43.8	38.2	21.9	16.7
1942-43	42.4	38.0	19.9	14.7
1943-44	43.5	38.0	20.7	18.9

CASE PACK, MEAL AND OIL PRODUCTION FOR CALENDAR YEARS 1928-1944

Sardines, 1-Lb. Ovals, Cases

Year	San Francisco district	Monterey district	San Pedro district	San Diego district	Total
1928	109,198	1,402,237	945,676	39,755	2,496,966
1929	204,878	1,834,648	1,438,159	12,225	3,489,910
1930	237,159	1,342,249	863,254	15,500	2,458,162
1931	307,575	696,640	498,996	----------	1,503,211
1932	125,737	334,019	415,874	----------	875,630
1933	239,917	598,616	365,750	----------	1,204,283
1934	292,216	798,942	531,619	----------	1,622,777
1935	301,455	825,011	615,808	----------	1,742,274
1936	225,185	864,498	586,038	----------	1,675,721
1937	101,912	577,405	761,776	----------	1,441,093
1938	164,559	556,477	600,532	----------	1,321,568
1939	225,462	1,023,285	627,524	----------	1,876,271
1940	178,316	755,639	664,241	----------	1,598,196
1941	459,454	1,142,052	689,210	----------	2,290,716
1942	164,452	638,343	619,881	----------	1,422,676
1943	270,005	775,446	400,504	----------	1,445,955
1944	228,561	822,836	434,414	----------	1,485,811

Sardines, Other Size Cans, Cases

Year	San Francisco district	Monterey district	San Pedro district	San Diego district	Total
1928	82,207	49,022	153,376	33,759	318,364
1929	71,546	77,340	286,135	16,528	451,549
1930	79,108	160,293	346,472	25,489	611,362
1931	17,929	77,785	192,641	3,425	291,780
1932	4,366	23,719	90,489	7,641	126,215
1933	10,226	81,458	116,301	10,592	218,577
1934	8,505	125,740	284,241	10,463	428,949
1935	28,383	477,103	273,565	11,437	790,488
1936	66,421	505,865	549,679	22,863	1,144,828
1937	18,290	411,817	1,099,513	12,491	1,542,111
1938	45,059	385,580	693,000	19,056	1,142,695
1939	96,331	647,743	705,588	229	1,449,891
1940	138,571	664,801	786,484	37	1,589,893
1941	436,487	1,424,558	1,240,748	2,775	3,104,568
1942	188,617	712,811	1,521,396	1,285	2,424,109
1943	140,547	893,335	919,572	697	1,954,151
1944	281,470	979,491	987,888	----------	2,248,849

Fish Meal, Tons

Year	San Francisco district	Monterey district	San Pedro district	San Diego district	Total
1928	1,589	10,986	12,923	2,367	27,865
1929	2,576	16,640	20,040	3,565	42,821
1930	3,375	13,752	13,653	4,859	35,639
1931	3,597	8,416	7,600	2,827	22,440
1932	2,435	12,560	9,846	2,659	27,500
1933	4,941	18,869	18,249	4,310	46,369
1934	11,138	34,492	27,236	4,858	77,724
1935	12,994	27,966	31,163	6,572	78,695
1936	24,593	30,431	23,588	7,655	86,267
1937	22,916	21,118	29,184	8,300	81,518
1938	31,773	25,202	24,209	6,732	87,916
1939	43,369	33,238	21,858	6,704	105,169
1940	21,256	28,004	29,542	7,335	86,137
1941	32,773	38,875	25,832	5,332	102,812
1942	17,748	25,170	31,633	4,452	79,003
1943	19,682	33,626	24,383	4,300	81,991
1944	24,452	42,452	34,945	5,283	107,132

Includes meal produced from sardines and other species of fish, and residuum from stickwater.

Fish Oil, Gallons

Year	San Francisco district	Monterey district	San Pedro district	San Diego district	Total
1928	282,043	2,174,673	1,268,518	24,068	3,749,302
1929	454,726	3,750,392	2,280,991	62,017	6,548,126
1930	747,931	3,769,950	1,282,893	41,989	5,842,763
1931	726,514	2,372,303	818,364	7,511	3,924,692
1932	426,831	3,378,929	1,293,961	25,678	5,125,399
1933	933,696	4,209,366	2,585,784	58,948	7,787,794
1934	2,490,156	9,322,080	4,221,447	94,525	16,128,208
1935	3,106,785	6,734,305	3,821,566	261,482	13,924,138
1936	5,626,422	6,756,541	2,834,887	260,059	15,477,909
1937	4,431,668	4,122,817	2,578,600	191,757	11,324,842
1938	7,032,792	4,753,160	2,126,661	130,606	14,043,219
1939	10,395,398	6,894,201	1,594,122	96,806	18,980,527
1940	4,831,500	5,745,120	2,509,291	129,079	13,214,990
1941	7,429,493	7,537,870	2,627,959	81,876	17,677,198
1942	4,183,492	5,219,441	3,146,680	137,027	12,686,640
1943	4,979,798	6,652,715	2,262,889	120,777	14,016,179
1944	5,722,966	8,509,678	3,903,785	133,356	18,269,785

Includes oil produced from sardines and other species of fish, except vitamin oil from livers.

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